FOOD INDUSTRIES

DECEMBER 1939

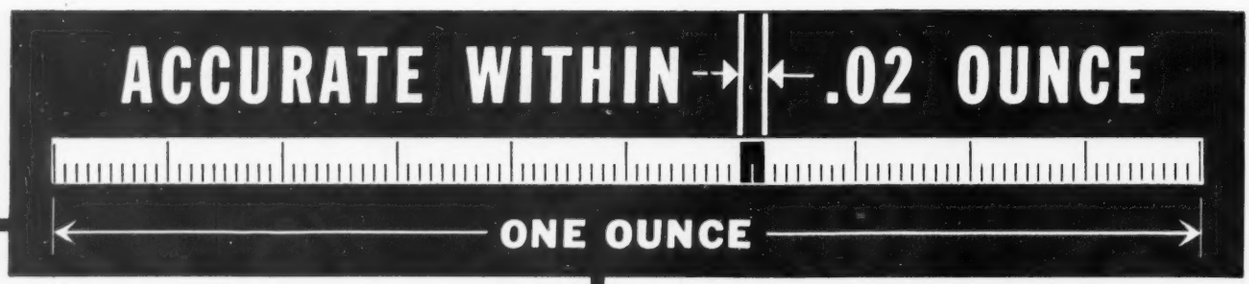
HOMES OF FAMOUS FOODS . . . LIPTON'S TEAS, HOBOKEN, N. J.

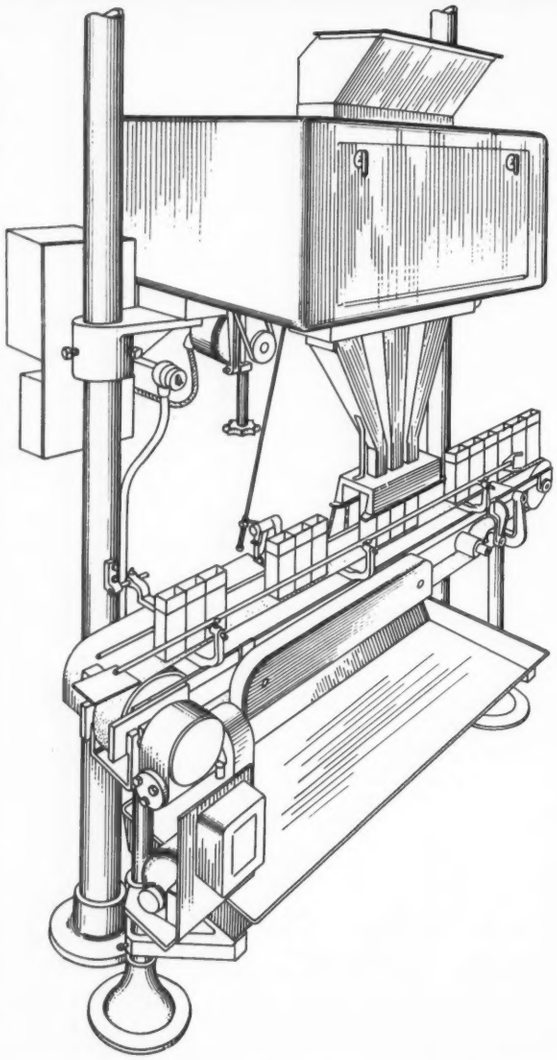
IN THIS ISSUE: Food Equipment at the Chemical Show, p. 669

Dehydration Equipment and Methods, p. 687

McGRAW-HILL PUBLISHING COMPANY, INC.

now Laboratory Exactness in Mass Production Weighing





CAN you visualize weighing 100 parts of an ounce 45 times every minute with a maximum error of only 2/100 oz.? Not an easy job yet Pneumatic's newest Net Weigher, Class No. 2612 is guaranteed to weigh within this tolerance on one or two ounce loads. Eight ounce net weights are also within this precision weigher's range with a guaranteed accuracy of plus or minus .05 oz. and a speed of 35 weighings per minute.

How is it done? By limiting the weighing range to 1 oz.–8 oz.! When heavier loads of 16 oz. or 2 lbs. or more have to be run on a weighing machine, stronger, more substantial construction is essential for dependable performance. But by restricting the machine's work to loads of 8 ounces and less, a light, quick operating, extremely sensitive design can be made entirely practical.

What will it weigh? Any reasonably free-flowing, non-abrasive material, packed in small containers! Tea for example, generally sold in 1⅜ oz., 4 oz. and 8 oz. cartons or cans. Long leaf as well as short cut varieties can be rapidly weighed within .02 oz. to .05 oz. accuracy depending on package size.

Average accuracy? No, the tolerances mentioned are not an average, they are maximum allowable error. Nearly every weight delivered by this precision machine will be exactly correct. The few weighings which are a bit off will not be out more than .02–.05 ounce.

Does this laboratory exactness suggest an opportunity for savings in your packing room? Pneumatic will gladly tell you how this Net Weigher can be built for your small package needs. Write to-day!

PNEUMATIC SCALE CORPORATION, LTD.
91 Newport Ave., Quincy, Mass. (Norfolk Downs Station)
Branch Offices:
NEW YORK · CHICAGO · SAN FRANCISCO · LOS ANGELES

LOWER COST PER CONTAINER

★ PNEUMATIC
PACKAGING & BOTTLING EQUIPMENT

FOOD INDUSTRIES

DISTRIBUTION PROCESSING — PUBLISHED MONTHLY

A McGRAW-HILL PUBLICATION

M. A. WILLIAMSON, Publisher — LAURENCE V. BURTON, Editor

E. S. STATELER, *Associate Editor*, Chicago — G. L. MONTGOMERY, *Managing Editor*

IVAN C. MILLER, *Distribution Editor* — F. K. LAWLER, *Assistant Editor*

R. S. McBRIDE, Washington, D. C. — PAUL WOOTON, Washington, D. C. — N. A. BOWERS, San Francisco, Cal. — S. T. HENRY, Spruce Pine, N. C.

ARTHUR S. ALLEN, Consulting Color Editor

Contents for DECEMBER 1939

VOLUME II • NUMBER 12

FOOD TECHNOLOGY

New Discoveries and Inventions

Food Technology
Sterilizing Fish Pickling Brines with U. V. 710
Pectin from Sweet Potato Pulp 710
Vinegar Making under Automatic Control 710
Wetter Water Aids Plant Cleaning 710

Bakery Products
Ascorbic Acid vs. Bromates 711

Dairy Products
Wrapped Butter Deterioration 711
Skim Milk for Coffee in Germany 711

Beverages
How To Produce Good Siphon Waters 711

Fats and Oils
Refining Corn Oil 728

Fish
German Views of Fish Freezing 728

Fruit Juices
Fruit Juice Standardization 728

Sugars and Starches
Maple Sugar Buckets and Lead Contamination 728

Miscellaneous
Frost Damaged Grain 728
Removing Spray Residues 729
Treating Egg Whites 729
Maltose Production 729
Blanching Celery in Storage 729

★HOMES OF FAMOUS FOODS

On the cover of Food Industries this month is shown the large multi-story building on the water front of Hoboken, N. J., where Lipton's famous teas are packaged and warehoused.

THIS MONTH

Food Equipment at Exposition of Chemical Industries 669
A Preview

Dehydration Equipment in Food Processing 687
By Francis Rosseau

PROCESSING

Food Equipment at Exposition of Chemical Industries 669

Method for Preventing Oil Separation 678
By C. W. Lenth

Diesel Engines Provide Power Economy 680

What Quality Control Means 684
By T. H. Butterworth

Dehydration Equipment in Food Processing 687
By Francis Rosseau

DISTRIBUTION

Attractive Trucks Build Business 682

New Milk Container Lowers Retail Price 703

Hints and Hurdles 705

New Products and Packages 707

EVERY MONTH

Talk of the Industry 665
Automotive Section 682
Food Technology — Abstracts 710
Formulas for Foods 712
Food Equipment News 713
The Food Industry News 714
Business Trends 718
Men, Jobs & Companies 720
Book Notes 732
Patents 733
Catalogs in advt. pages

McGRAW-HILL PUBLISHING COMPANY, INC.

JAMES H. McGRAW, Founder and Honorary Chairman

Publication Offices: 99-129 North Broadway, Albany, N. Y. *Editorial and Executive Offices:* 330 West 42d Street, New York, N. Y.

Branch Offices: 520 North Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, Aldwych, London, W. C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

JAMES H. McGRAW, JR., President — HOWARD EHRLICH, Executive Vice-President — MASON BRITTON, Vice-Chairman — B. R. PUTNAM, Treasurer — D. C. McGRAW, Secretary — J. E. BLACKBURN, JR., Director of Circulation

Published monthly; price 35c a copy. Subscription rates: United States, Canada, Mexico and Central and South American countries, $3 a year. All other countries $5 a year or 30 shillings. Entered as second-class matter Aug. 17, 1936, at the Post Office, Albany, N. Y., under the act of March 3, 1879. Cable address: "McGrawhill, New York." Member of A.B.P. Member of A.B.C. Contents indexed monthly in the Industrial Arts Index.

Copyright, 1939, by McGraw-Hill Publishing Company, Inc.

In THIS *Issue*

• DRY YEARS AHEAD?

As we pointed out in FOOD INDUSTRIES last June (pages 310 and 318), modern armies demand greatly increased quantities of dehydrated foods. And, quite possibly, such demands will accustom consumers to greater use of dried foods and, when peace comes again, leave the food industries faced with the necessity of drying many foods now processed in other ways. Incidentally, food dehydration is a growing industry, even without the stimulus of war.

All of this heightens the timely interest of the engineering study of dehydration equipment by Francis Rousseau, beginning on page 687 of this number of FOOD INDUSTRIES. The author is a specialist in food dehydration and has been responsible for a number of developments in the art. Save his article in your files, for a drying era in food processing may be ahead, and then you will find it doubly useful.

• GLIMPSE AT THE FUTURE

If you want to see what some of the equipment in the food plant of tomorrow will look like, visit the 17th Exposition of Chemical Industries at Grand Central Palace, Dec. 4 to 9. Much of this equipment will be shown there.

But, perhaps you will not be able to get to New York at that time. Then first read the 9-page review of the equipment exhibited at the Show, beginning on page 669 of this issue of FOOD INDUSTRIES. Next, turn to the back advertising pages. You will find there an insert on blue paper which lists many of the catalogs that deal with the equipment exhibited. FOOD INDUSTRIES will be glad to get any of these catalogs for readers who mark the coupon and mail it to us.

• WHAT IS QUALITY CONTROL?

If you are not sure of the answer to that one, read the article by Dr. T. H. Butterworth, beginning on page 684. The author has had a long experience in quality control work in the food plants of Texas. He not only tells what quality control is, but also gives the reader something on the how and the why of the subject.

• THE OIL STAYS PUT

Makers of peanut butter and other mixtures of oils and solids-not-fat, have long been plagued by the tendency of the oil to separate out into a nice clean layer at the top of the container. This not only lowered the quality of the product, but also annoyed consumers to a considerable extent.

Now it has been discovered that this trouble can be overcome. C. W. Lenth, in his article beginning on page 678, tells how this is done.

In FORTHCOMING *Issues*

• FOR FAIR EXHIBITORS

What will stop the crowd, and how can we hold them long enough to get our message across? These are questions that come to every food company executive responsible for a World's Fair exhibit.

To help answer these questions for those who will exhibit at New York or San Francisco in 1940, or perhaps in later years at other fairs, FOOD INDUSTRIES made an extensive study of the food exhibits at the New York World's Fair last summer. The findings of this study will appear in an early issue.

• GETTING QUALITY IN BEER

No food product is more sensitive to conditions that lower quality than is beer. And in no other food product do consumers demand a more uniform quality, year in and year out. All this makes the quality control problems of a brewery particularly exacting.

B. H. Nissen will tell, in an early issue, how one great brewery meets its problems of quality control.

• "SHORTS" VS. "LONGS"

For some time now the controversy has raged as to whether or not short time pasturization of milk should be adopted. It's still a moot question, so in forthcoming issues of FOOD INDUSTRIES fuel will be added to the flames by presenting the views of milk plant operators and of health officials on the subject.

• LET'S KEEP THINGS CLEAN

Stainless steel is a great invention and its introduction has brought remarkable advances in the food industries. But many of these advantages depend upon the smooth and highly polished surface of the metal. Stainless steel, to give best results, should be cleaned often and cleaned so that its useful characteristics are fully retained. Just how to go about this will be told by G. C. Kiefer in an early issue.

• FREEZING AND BEEF QUALITY

In these days when food freezing is more and more widely used, the question of how freezing affects quality has become of first importance. The answer to this question, as far as it concerns beef, will be given in FOOD INDUSTRIES early in 1940.

FOOD INDUSTRIES
DISTRIBUTION • PROCESSING
Established 1928 — McGraw-Hill Publishing Company, Inc.
LAURENCE V. BURTON, Editor
Volume 11, Number 12 December 1939

The Talk of the Industry

» "RESEARCH" ORGANIZATIONS connected with the consumer movement, it is darkly hinted, are to be investigated by Congressman Martin Dies' committee—the Congressional Joint Committee on un-American Activities.

Though the organizations are unidentified, your first and second guesses will probably be correct.

The investigation, if it really occurs, will probably be quite a show, but wholly unproductive of anything else. Mr. Dies should be informed that "research" organizations connected with the consumer movement thrive on this kind of publicity and a chance to trot out their respective martyrdoms.

» BY A SPECIAL FORM of undisclosed chemical treatment, it is now possible to "sanitize" textiles so that they become self-sterilizing. The treatment does not injure the fabric, nor is it harmful to human skin. Though the chemical is water soluble and is, hence, removable by laundering, it is not removable by dry cleaning.

In pondering its possible industrial applications the conclusion is inescapable that it would be quite useful in avoiding that lion-cage aroma associated with front line soldiers in modern warfare.

» THE CALENDAR of "weeks" in the United States is filled up with the promotion of this or that commodity or activity for the benefit of its promotors. England, however, has a week, National Rat Week, that was held Nov. 6-13, war or no war, under the auspices of the Ministry of Agriculture and Fisheries. That week is designated as a time for a concerted effort to take all possible steps toward exterminating vermin. Good idea. It benefits everybody.

» THOSE WHO FOLLOW Federal Food Regulations should no longer trust their memories regarding rulings. The reason is that a new series of bulletins and publications is coming out of the Food and Drug Administration. For instance, one of the more recent ones is "Service and Regulatory Announcements, Food, Drug and Cosmetic, No. 1." Apparently the old series of numbers is to be duplicated, and when one refers to S.R.A. followed by a number it will be appropriate to inquire whether this is under the Food and Drug Act or the Food, Drug and Cosmetics Act.

» BEING somewhat disposed to doing things in a dignified way, i.e., taking our time and plenty of it, we were delighted to see the doubt thrown upon the attractions of the new high speed airlines between New York and the Pacific Coast by the New York Times. What is the use, they ask, of getting to Los Angeles in time for breakfast, for breakfast will be the same old orange juice, toast and coffee. One can get that in any place.

Which plaint serves to bring to mind one of the penalties of standardization that seems to stem directly from the improved ease of getting from one part of this country to another. Time was when breakfast, to say nothing of dinner and supper, took some character from the locality in which it was served.

The deep South had its grits and grunts to balance against the doughnuts and pie of New England, while the Bolivars of New York and the scrapple of the Quaker City matched the corn and sorghum of the Middle West.

One pauses to shed a tear over the fact that with all such good, traditional foods to draw upon, Americans should regiment themselves into a uniform diet and then crow about it.

» THE GERMAN PEOPLE'S incapacity for self government seems to be at the very bottom of the trouble across the water. Perhaps, after a few more decades, they will acquire that ability

which is so necessary for a peaceful Europe.

In the meantime, the world shudders and suffers while awaiting the time

when German political thought shall reach maturity. But, until they stop teaching the evil philosophies of Nietzsche and von Trietschke to the youth of that misguided land, there can be no freedom anywhere from the overwhelming cost of huge defensive armaments.

Trietschke preached the doctrine that man exists for the state, whereas the more enlightened view is that the state exists for man. Where a large nation believes in his undemocratic idea, there is where the malevolent ambitions of any individual who heads the state are entirely without internal restraint. Nietzsche taught the Germans to believe that they were a race of supermen, destined to rule the world. Acceptance of both notions by a spirited people will spell trouble anywhere, irrespective of race or nationality. Though both of these evil thinkers have been dead for 40 years or more, their influence survives in books that are widely read and studied by youth in Germany.

The Flurry Is Over But Business Is Good

IT is now possible to appraise the events of autumn in the food industry with a little better perspective than was possible a month ago. The price flurry of September was brought about almost entirely by housewives who began to stock up in anticipation of war demands. That conclusion appeared to be correct when the excitement was at its height, but it is now confirmed.

A friend who operates a slow moving, non-seasonal, non-perishable food business producing a line of goods that should be the last to respond to feverish consumer buying has supplied the pattern of the trend. September business was 150 per cent of normal, October was 92 per cent of normal, while November is just about normal. Also, retailers and wholesalers stocks are normal. Evidently consumers' larders must be better stocked than normal.

Sugar had its flurry, and canners who operated on seasonal crops had to pay the price or do without. Pork went up and down. So did many other items. A. C. Nielson reported to AGMA that the average consumer stock-up was about 2 per cent as a result of the declaration of war overseas.

At the present moment there is no expectation of huge movements of foods or strong trends to higher or lower prices as a result of war. Shipments of canned fruit to Europe and U. K. originating largely in Florida, Texas and the West Coast have been greatly speeded up, but the total volume is not as much greater than in previous years as would have been expected as a result of the war. Allied food purchases are to go principally to South America for the time being, while the United States will get plenty of munition and war equipment orders.

In brief, the food business has returned to normal. How long it will stay that way is dependent principally on consumer psychology, until another crop season comes round or foreign demand increases. But in the meantime, despite absence of war orders for food, the food industry is doing well.

No Warmongers Here!

AVERY hopeful sign is the fact that business leaders are learning to take a long time view of current events. In particular they are thinking in terms of public relations as to their attitude or expressed sentiments toward war. If any lowly citizen believes today that business is a warmonger, it is difficult to see where there is any factual basis for such an opinion.

Fortunately, there are enough executives in high place today who are old enough to recall the rude awakening from the delirious business demands of 1914–1919. They have seen all their war-time profits disappear, and then some, in the ensuing years. And many have lived to see what

Hors d'Oeuvres

• *Because of the long and excessively hot summers in Egypt, a good potential market exists there for American carbonated beverages, says a commercial attaché. Wonder how much Coca-cola it would have taken to refresh Mark Anthony after an evening with Cleopatra?*

• The kola nut, the extract of which is used to flavor beverages, is employed as a medium of exchange in parts of Africa. And Ripley says 30 of them will buy a handsome wife. Wonder how many wives worth of kolas are consumed in this country per capita annually?

• *There is a story about a Brooklyn baker who makes cakes decorated with cartoons and electric lights and equipped with music boxes. Now he is working on a cake that talks. When he gets that done he should develop one that eats itself, then his market would be unlimited.*

• Moxie Co., Boston, is considering the installation of two-way radios in its trucks and sales cars. Then a phoned order would be immediately transmitted via air waves to the truck nearest the dealer placing the order, giving service rivaling that of the police. Sounds effective, even if not efficient.

• *Beer taxes swell government receipts by a million dollars a day. Wages paid by brewers support a million families. And the brewers pay farmers one hundred million dollars annually for their crops. That's three tall ones on the house.*

• Germany, generally a substantial buyer of large Brazil nuts, took none this year. Yes there undoubtedly is an abundant supply of big nuts in the Reich.

• *The New York World's Fair 1939 is history, but a remark overheard at the exhibit of Frosted Food Sales Corp. ought to be passed on for posterity or something. A woman saw samples of quick-frozen Birds Eye loganberries being handed out on toothpicks. Quoth she to a friend, "No mam! Not me! I wouldn't eat none of them birds' eyes."*

• We commented recently that rabbit production was increasing so fast that the hare raising curve was standing on end. Now comes a warning from Cornell University that there is a possibility of financial loss as well as gain to persons investing money in this enterprise. The profits hang by hares.

• *Borden's* Milky Way *says a famous beauty expert is selling a "pasteurized milk bath" in cute little milk bottles racked in a miniature red wire replica of the milkman's bottle carrier. Eight bottles, complete with an "enchante odeur," sell at $3.75. A bit steep for milk, but sometimes that "enchante odeur" business is worth $3.*

• Sales of goat milk are increasing in New York City. But to hear Mayor LaGuardia talk about the dairy companies that recently raised the price of milk, one would gather that it is the sale of milk to goats that is increasing.

• *American Spice Trade Association estimates that if every family in America used just two shakers of pepper a year, the world's supply would be exhausted. Which is a demand to be sneezed at.*

• "Mineral feeding prevents creeps" says the heading on a story about bovine dietetics. Must put sand in the craw.

F. K. L.

was once considered to be a splendid export market dry up completely.

No Forecast for 1940

EVERY year at about this time there is a clamor for an editorial forecast of the state of business to be expected for the coming year. Sometimes we fall for it. This time we shall not.

To make a reasonably sound forecast one must be able to predict, not only the outcome of the European War, but its month-to-month progress and the ultimate date of its conclusion. Also be able to predict the future actions of Russia which, up to now, have left the statesmen of the world in a slightly bewildered condition.

If the world were at peace, one could with certainty be assured of a normal domestic market for foods and their general price relationships. But export demand may go up or down. No one can guess how many cargoes of foods destined for European ports will be captured or sunk. No one can guess how much food in storage by belligerents may be destroyed if hostilities become very aggressive, nor how it will be replaced.

No, there will be no reasoned prediction here about the next year in the United States food business. We expect that it will be very good. Expectations, however, are not predictions. All that we can be sure of is the constant demand for 1,460 lb. of food per person per year. Each manufacturer will sell his share if his prices are in line. And his prices can be in line if his costs and quality are in line.

War Forces Changes in Food Processing

WHENEVER a national emergency arises, many industrial changes can be expected. What is occurring in Canada illustrates this point. Canada is going in for dehydration of fruits and vegetables in a big way. In Nova Scotia, for example, approximately 1,500,000 barrels of the 1939 crop of apples have been dehydrated, where previous production of dehydrated apples has been relatively small.

War time creation of new industries is sure to have a long time effect when hostilities cease. Just what will be the ultimate effect on the food industry of the United States of development of a huge dehydration industry by our northern neighbor will depend on cost, quality and the public acceptance of dehydrated products.

Up to now, all that we know is that the Canadian dehydrated vegetables, when "refreshed", are almost indistinguishable from the raw material, according to one informant.

This new development is being watched with considerable interest, but at present there is no basis for appraisal of public acceptance of dehydrated foods under peace time conditions.

Thoughts on Neutrality

A NEW tax on wages and salaries of all workers in France is to be imposed. The tax will be 15 per cent. Let us not, however, congratulate ourselves that the United States, being a neutral, shall, therefore, escape comparable taxes in this country. One recalls that our present federal income tax began in 1913 and rapidly increased before we got into the World War.

To be peaceful does not insure peace. To be neutral does not avoid the cost of defense. Nobody anywhere can escape the costs of warfare as it is conducted today. Holland and Belgium face ruinous defense costs or possible extinction. So do many other neutrals. And the U.S.A., though not now facing these alternatives, must begin to accept the costs.

Our much vaunted American standard of living is, it appears, probably due to the fact that heretofore we have never felt the need of maintaining a huge military establishment. But our nation has recently embarked on subsistence of the unemployed in numbers that far exceed any European standing army—perhaps all European armies. Which is not to decry a humanitarian policy, yet it brings up the nice moral problem of appraising the ultimate good of spending and creating employment, or of giving and perpetuating unemployment. (Most of us do not possess enough means to both spend and give at the same time.) In either case, hunger and want are relieved, but, in the case of spending, the spender has acquired something he desires. Whereas the giver has only a fleeting sense of satisfaction over assisting those in want.

Elimination of the human wants of the unemployed via the route of relief merely temporarily solves the needs of the unhappy and unfortunate. Those who give are seldom able also to spend. Hence the satisfaction of the wants of the unemployed, by relief, actually leaves the wants of the employed unsatisfied.

The conclusion is inescapable that increased spending and less giving will create greater satisfaction all around. And it begins to look as if increased armaments would have been a much better investment than wages to the leaf rakers or shovel leaners of the lamented past.

Which brings us around to the question of neutrality again. If we are forced to pay a huge price for neutrality, let us pay that price in such a way that our neutrality shall always be a matter of national satisfaction, not regret. Billions for defense will at least give us a navy and an army. Billions for relief gives us only a palliative—and no adequate defensive force. And one suspects that a huge navy will come in handy in the sweet bye and bye.

Farmer Relations Need More Cultivation

A TEN-DAY stay on an 80-cow dairy farm in Vermont has revealed an almost unbelievable absence of all knowledge of anything outside the routine job of milking cows, the price of milk and the price of feed. All the farmer knew was that he received about 4 cents a quart (Grade A) for his milk while he had heard that retail customers in a distant city paid better than 12 cents a quart.

The inevitable young country school teacher who boarded at this farm touched off the fireworks one night by a sophomoric tirade against the evils of middlemen and the iniquities of distribution. The explosion was so violent that this department remained not only incognito but silent until the storm abated. Only then did we dare to ask a few questions which developed that this peaceable farmer believed that city dairies netted at least a 5 cent per quart profit! And that he believed that route salesmen received something less than $20 per week, that pasteurization and processing of milk cost so little that the cost item could hardly be traced, that the cost of cleaning and maintenance of dairy equipment was a negligible item. He was vehemently positive that no dairy company ever went broke. Consolidations and sell-outs meant absolutely nothing. What effect municipal boards of health and their regulations might have on the cost of operating a dairy was a complete blank. And the school teacher was no better informed, yet her prejudices were being turned loose on eleven youngsters from nearby farms.

HERE was an opportunity to introduce a bit of understanding which was grasped, cautiously to be

sure, for the farmer's good wife was in a dangerous mood. We took the point of view that there were many factors to be considered in arriving at a conclusion as to the real culprit in the price spread between farmer and ultimate consumer. Certainly the farmer deserved our sympathy. But had he ever heard of the big Brooklyn dairy that had to buy up all the adjoining tenement property and put out all tenants because they perpetually complained about noise at night? Here was an investment of about $200,000, that was wholly non-productive, solely to keep themselves out of continual and costly litigation, yet the interest and taxes had to be charged into the retail cost of milk.

Had he ever heard of the long hours of work required for cleaning and sterilizing equipment, or the huge investment in trucks, vans, tank trucks and refrigerating and ice making equipment? Or the cost of depreciation, maintenance and daily operation of all this equipment which must be charged into the retail cost? Did he know how much it cost to peddle a quart of milk? Did he know that many dairies find it cost about 2½ cents a quart merely to deliver milk from dairies to homes? Did he know anything about unions of milk wagon drivers? Or that a retail driver in a big city gets $40, $50 or even $60 per week—that he often can compute his wages in terms of thousands of dollars?

NONE of these things were known to the farmer, his wife, or the school teacher. The wife began to comment and ask questions. She wanted to know what the dairy companies were doing to reduce costs. Consolidations were related in detail. One instance of combining four plants into one to eliminate about 400 jobs—thereby creating about 400 possible candidates for relief—to hold down the spread. The farmer's wife shuddered. The good people were also told of the hostility of driver's unions to store deliveries except at greatly increased compensation, the hostility of unions to drivers' helpers, the phony battles over the possible use of cheaper lightweight containers and the like. The windup was along these lines: that the problem was very complex—so vast that no one seemed to be able to solve it. That anyone with knowledge of all the facts could find a degree of sympathy with any particular point of view, that the much maligned distributor, i.e., middleman, resisted any increase in the price spread to the limit of his ability and yet remain in business. His resistance was beneficial to the farmer, for higher prices to consumers meant only diminished consumption of fluid milk.

SAID the farmer's wife, "I don't think that any milk peddler in town should earn more money than the man who produces the milk and works about sixteen hours a day."

Said the farmer, "Well, I still stick to my belief that I never heard of a dairy company going busted. I'm going to bed."

The teacher had no comments.

Admittedly there has been no follow-up. Yet we are hoping that this bit of discussion will have been a bit of leaven that will produce better understanding in one isolated spot. If this single instance of lack of knowledge is symptomatic of the basis of many other farmers' thinking, then the remedy appears to be clear—though slow of application.

Foods Do Compete

ORDINARILY you don't hear many public admissions of the impact of competition of one food with another. FOOD INDUSTRIES has talked about it from time to time, usually without very much response. Readers apparently can't be bothered with statistics, graphs, trend lines and probabilities of production and prices of competitive foods. The one exception to the apparent disinterest is certain of the larger units engaged in production and sale of sea foods. These are vitally competitive with eggs, poultry and pork.

It was something of a novelty, therefore, to observe that one of the concerns engaged in the refining and hydrogenation of vegetable oils has very recently taken official cognizance of the low price of lard which competes with its own shortenings. A considerable loss on the past year's operations is ascribed to the very low competitive lard prices.

At this time, it is difficult to conclude whether prices of vegetable shortenings have been dragged down because of the low price of lard or whether the manufacturers of lard are doing a better selling and merchandising job. Whichever explanation holds, the net fact remains that the future trends of volume and prices of those foods which are directly competitive are always very important in programing future operations.

For the benefit of men who are far down the line of authority may we say, statistics may be a bore to you, but if you ever expect to rise to top jobs where there is real money in the paycheck, you must learn how to read statistics *and like them,* and plan your decisions in the light of every bit of knowledge you can acquire.

Vitamins to Grocery Stores

A COURT in Indiana has contributed a bit of judicial clarification to the place of vitamins in our human economy. Differentiating between heavy therapeutic doses of vitamins for curative purposes, and smaller doses which are, in the court's opinion, merely food supplements, vitamins therefore are a part of our foods. And by the foregoing reasoning the court overturns a ruling by the Indiana Board of Pharmacy, which had prohibited the sale of vitamins in grocery stores. Vitamins, the board averred, were pharmaceuticals and thus were restricted to sale in drug stores.

Vitamins are now food supplements in Indiana. Apparently, this is the first case of this character to be tried before a court.

When Sucrose Isn't Sucrose

IT begins to appear that Mr. John McDill Fox of the Solicitor's Office, U. S. Dept. of Agriculture, has stuck his foot into the fly paper with his official suggestion that labels for canned fruits containing sucrose shall show whether the sugar is beet sugar or cane sugar. Mr. Fox, you may recall, was presiding officer at the hearing on standards of identity for canned peaches.

Were it not for the inspection privilege granted to the government in the new food law, anyone could violate that proposed label regulation with impunity. And get away with it. Beet and cane sucrose cannot be distinguished from each other.

It is hardly likely that even a biased zealot in the Food and Drug Administration would care to try to enforce such a proposed regulation. And the idea is so absurd that one feels that the F. and D. Administration will oppose its adoption.

Barometer

FOR the benefit of those who cock an eye toward the speculative side of business and equity securities, let it be said that there is a growing belief among sound economists that runs like this. When steel production reaches a rate that is better than 90 per cent of the industry's capacity, there is no place for it to go but down. When the rate goes down to about 30 per cent of its capacity, there is no place for it to go but up.

Previewing the Chemical Show

Wide Range of Food Processing Equipment To Be Exhibited

at 17th Exposition Chemical Industries, Dec. 4-9, Grand Central Palace, New York City.

- **Ask Yourself These Seven Questions**
- **Find the Answers at the Chemical Show**

PLAN to visit the 17th Exposition of Chemical Industries at Grand Central Palace, New York City, between Dec. 4 and 9. Every exhibit of machinery and equipment at this huge show is devoted to the needs of the processing industries, including the processing of food as well as of chemicals. From the food manufacturing viewpoint, this exhibit is to a large extent a showing of food engineering equipment, for food engineering is one important division of the broad field of chemical engineering at which the show is aimed.

A DAY or an evening at the Chemical Show will be worth your while without any previous preparation, but you can get much more out of the time spent there if you make definite plans for your visit. The values that you take away from the Chemical Show will depend largely on what you take with you in the form of planned and organized curiosity. And the less time you can spend at the show, the greater is the need for this advance planning.

To make it easier to decide what you need to see at the Chemical Show, the following pages have been prepared to show you what you can expect to find there. In these pages, the equipment is arranged in accordance with its operation or function in food processing, under such headings as mixing, grinding, drying and the like. Also, a list of manufacturers' bulletins and catalogs referring to this equipment has been prepared. You will find this list in the advertising pages of this copy of FOOD INDUSTRIES. Use it to obtain additional information about equipment in which you are interested.

CHARLES F. KETTERING, head of General Motors Research Corporation, once told a business man who could see no value in research that he should write down ten things that were wrong with his business. These would be the things that he should investigate by research.

In somewhat the same way, ask yourself, before you go to the Chemical Show, not what is done wrong but what could be done better in your plant. List every operation in the manufacture of your product. Then try to estimate savings you would make if you had the answers to the following seven questions: Can these operations be done (1) more cheaply, (2) more quickly, (3) in smaller space, (4) with more accurate control, (5) with less waste, (6) with less preparation in previous operations and (7) with less supervision?

Then, where some operation or process shows up that gives promise of a reward if it can be improved, go through the following "Preview of the Chemical Show" to see what companies are specializing in that operation or process. Those are the operations where you will find it profitable to concentrate your efforts and studies when you go to Grand Central Palace.

After you have concentrated on the exhibits where you have a carefully considered quest for information, then take a look at everything else that you have time to see. At previous shows, some very useful information has been developed after lengthy discussions in places where one would not normally expect to find it.

TO get into the show is easy. All you have to do is fill out a registration card. FOOD INDUSTRIES and *Chem. & Met.* will have an exhibit there (Booth 42), where you are invited to look in and renew acquaintance.

Grand Central Palace is on Lexington Avenue, between 46th and 47th Streets, New York City. This is only four blocks north of Grand Central Station.

Disintegrating

Several machines for reducing large particles of foodstuffs to smaller ones are to be included in the show. These include various types of grinders, pulverizers, cutters, defiberizers and granulators, suitable for any degree of disintegration of foods.

Listed below is the equipment of this type that will be exhibited:

Abbe Engineering Co., New York, N. Y.—Ball, pebble and jaw mills and rotary cutters.

Eppenbach, Inc., Long Island City, N. Y.—Colloid mills, rotor mills and disintegrators, all applicable over a wide range of food processing operations.

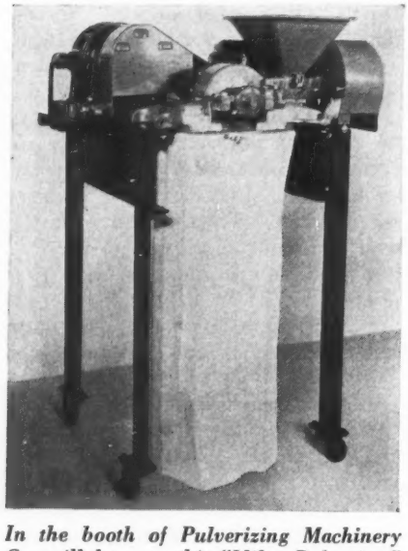
J. M. Lehmann Co., Inc., Lyndhurst, N. J.—A laboratory size, 3 roll grinding mill, Type 6-A.

Manton Gaulin Mfg. Co., Inc., Everett, Mass.—A two-stage colloid mill and a laboratory homogenizer. The two-stage colloid mill handles fine or coarse material, the impellers in the first stage acting as cutters and shredders to disintegrate the material preliminary to finishing in the final stage. It is of stainless steel construction, has water cooling jackets, is easy to clean and is non-foaming, according to the manufacturer.

Premier Mill Corp., Geneva, N. Y.—Several sizes and models of the Premier colloid mill. This mill is of vertical construction, without complicated seals and packing glands, and is of corrosion-resistant construction. Adjustment for clearance between the smooth-surface rotor and stator is simple.

Process Machinery Co., San Francisco, Calif.—The Rietz micro-disintegrator for the reduction of size of either wet or dry materials.

Pulverizing Machinery Co., Roselle Park, N. J.—Several models of the



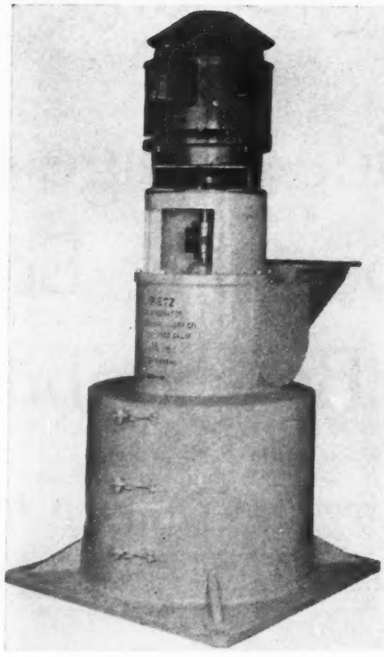
In the booth of Pulverizing Machinery Co. will be seen this "Mikro-Pulverizer" for small-production fine grinding

Mikro-Pulverizer, including a new "bantam" unit for small production and laboratory work. These machines, for both wet and dry grinding, are used for fine pulverizing of such foods as sugar, sugar mixtures, chocolate, cocoa, malted milk, dry milk, food colors, spices and soya beans.

Raymond Pulverizer Division, Combustion Engineering Co., Inc., Chicago, Ill.—A number of grinding and pulverizer machines including a bowl mill in operation, an operating roller mill, a 12-in. screen pulverizer for small grinding operations, and a laboratory size screen pulverizer.

Robinson Manufacturing Co., Muncy, Pa.—A saw-tooth crusher, a small knife cutter, a large knife cutter, a hammer mill and a "super screen" pulverizer, the latter of the hammer type.

Sprout, Waldron & Co., Inc.,

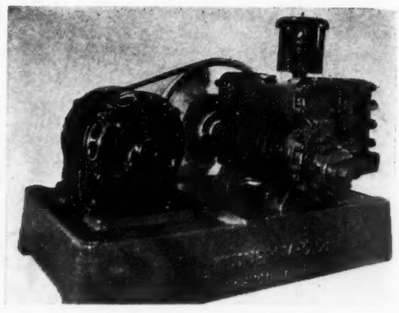


Rietz disintegrator for dividing product into fine particles. It will be seen at the booth of Process Machinery Co.

Muncy, Pa.—A knife cutter which has been used for producing steel cut grain, steel cut coffee and for cutting raw materials for spices; a single disk swing head blending, defiberizing and granulating mill said to granulate food products with a minimum production of fines and to blend by a rubbing action when equipped with special plates; and a saw tooth crusher for breaking up lumpy material to a given screen size, used for crushing okra cake, chocolate, dry bread and many other food products.

Drying

There will be half a dozen or so displays of machines which remove water from foods by exposing the



Kinney Manufacturing Co.'s new ultra-high vacuum pump may find applications in vacuum processing and filling of food products

product to air or vacuum in thin layers or films or in individual particles. Of particular interest, perhaps, will be a demonstration of vacuum drying with the temperature below the freezing point of water. Below are listed the drying equipment exhibits.

Beach-Russ Co., New York, N. Y.—High-vacuum pumps for such food industry operations as vacuum drying or dehydration.

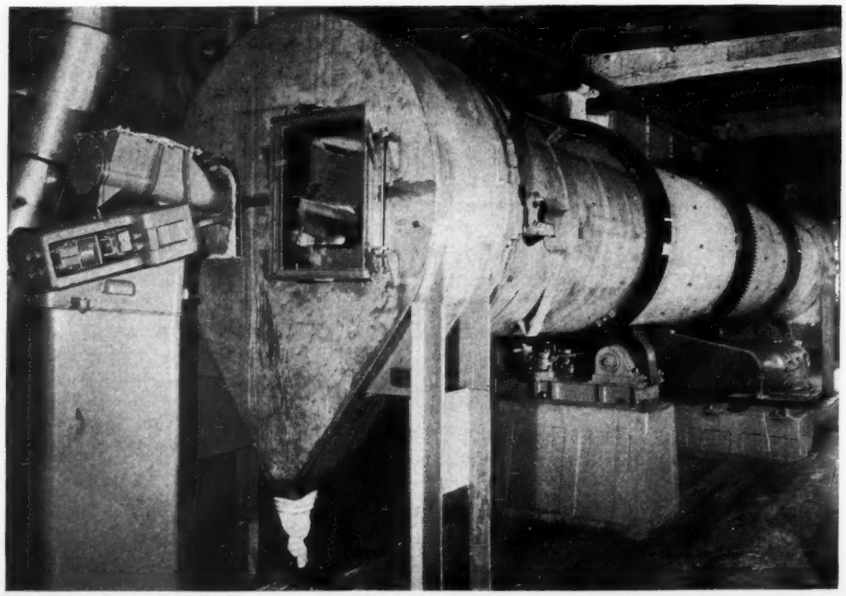
Blaw-Knox Co., Pittsburgh, Pa.—Informational exhibit on company's rotary dryers and flaker drums.

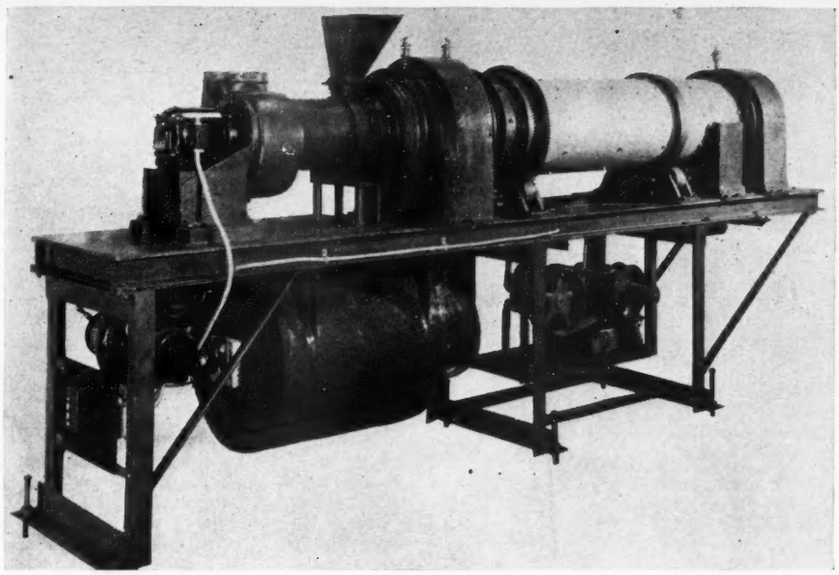
Despatch Oven Co., Minneapolis, Minn.—Two drying ovens of forced-draft type. One is electrically heated, the other, gas heated. Both are designed for close temperature control. Also, a small industrial air heater for chemical dryers.

Filtration Engineers, Inc., New York, N. Y.—New "repuddling" process to be used in connection with continuous rotary drum filters to effect greater dewatering of filtered materials. The device alternately subjects the cake to vibration and to vacuum.

Hersey Manufacturing Co., South Boston, Mass.—Model of a new drying system which uses exhaust gases to

Stainless steel rotary dryer for removing moisture from foods, made by Blaw-Knox. This and other equipment will be explained in an informational exhibit





This experimental dryer is typical of the Type "L" dryer made by Louisville Drying Machinery Co., in which hot products of combustion first pass through the dryer within ducts formed inside the dryer shell and then return through the dryer itself, in contact with the material being dried, so that the hottest gases do not come into direct contact with the material

preheat wet material fed to dryer and which also traps all dust. It is for light weight, finely divided materials of rather high moisture content.

Kinney Mfg. Co., Boston, Mass.—New compound high vacuum pump for absolute pressures below 1 micron. Also, single-stage vacuum pump.

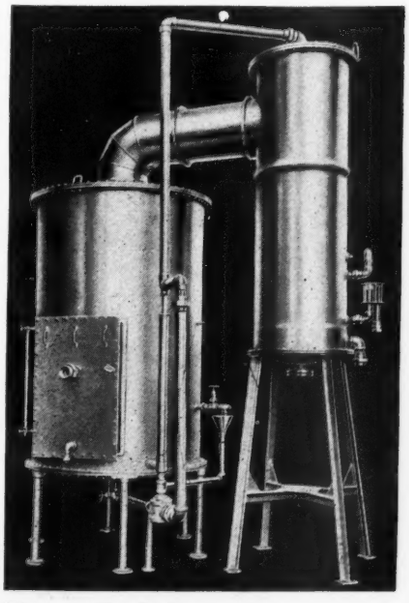
Louisville Drying Machinery Co., Louisville, Ky.—The Type L dryer, an indirect-direct heat type of rotary dryer.

Monarch Mfg. Works, Inc., Philadelphia, Pa.—Spray nozzles for use in spray drying of milk, etc.

Philadelphia Drying Machinery Co., Philadelphia, Pa.—A variety of dryers will be illustrated, and on display will be a special type of cabinet tray dryer for making accurate determinations of the drying characteristics of materials which can be dehydrated in an atmospheric dryer.

Proctor & Schwartz, Inc., Philadelphia, Pa.—"Aero-Form" dryers, with both rolling extruder feed and fin drum feed, for drying materials after filtering, will be in operation at this booth, while high and low temperature laboratory dryers and a cabinet tray dryer will also be shown.

F. J. Stokes Machine Co., Philadelphia, Pa.—Cereals, milk, fruits and other foods may be dehydrated with the atmospheric type drum dryer to be shown; the unit on exhibit will be of laboratory size. Exhibited in conjunction with a demonstration of low temperature vacuum drying, with the temperature below the freezing point of water, will be a high-vacuum pump, capable of maintaining a vacuum within a small fraction of a millimeter absolute, and a new type of vacuum gage with a range of from 0 to 5,000 microns.



Water still which may be seen in the booth of Barnstead Still and Sterilizer Co. It has a capacity of 400 gal. an hour

Evaporating

In the list below are the displays in which will be found equipment for evaporating water from solutions or suspensions, including distilling.

Barnstead Still & Sterilizer Co., Inc., Boston, Mass.—Water stills of types varying from small steam, gas and electrically heated models for laboratories up to a large steam model for food plants. A completely automatic still-tank unit will be shown, together with extra-duty stills for hard-water service.

Beach-Russ Co., New York, N. Y.—High vacuum pumps, such as may be used on vacuum evaporators.

Blaw-Knox Co., Pittsburgh, Pa.—Informational exhibit explaining the company's vacuum evaporators.

Kinney Mfg. Co., Boston, Mass.—New compound high vacuum pumps for absolute pressures below 1 micron. Also, single-stage vacuum pump.

Lee Metal Products Co., Inc., Philipsburg, Pa.—Steam jacketed kettles of stainless steel, nickel and Monel metal, of vacuum, atmospheric and pressure types, with and without agitators.

The Pfaudler Co., Rochester, N. Y.—A small glass-lined high pressure kettle and a 60 gal. glass-lined jacketed evaporating pan, also miscellaneous glass lined fittings, tanks and other small units. Featured in the exhibit will be a complete glass-lined distillation assembly with glass-lined pipe and fittings, and a glass-enameled agitator in the still. Also, a laboratory still.

Swenson Evaporator Co., Harvey, Ill.—An operating model of an evaporator, made largely of glass.

Forming

If you want to market a product in tablet or pellet form, take a look at the machines in these exhibits:

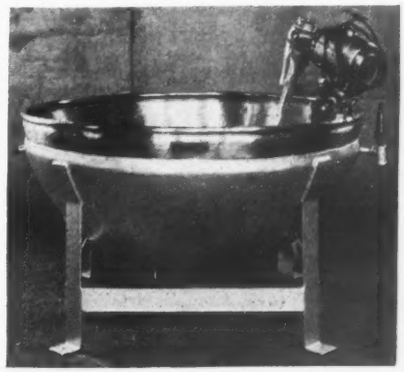
Hydraulic Press Mfg. Co., Mount Gilead, Ohio—Injection molding machine. Information may be obtained at exhibit on equipment for compressing loose granular materials, as salt, into solid blocks.

Sprout, Waldron & Co., Inc., Muncy, Pa.—A pellet mill for agglomerating permeable free-flowing materials into the nodule or pellet form.

F. J. Stokes Machine Co., Philadelphia, Pa.—A tablet machine of the type used for compressing salt, coffee, rennett, starch, malted milk, candies, etc. Production rates are up to 1,000 and more pieces per minute.

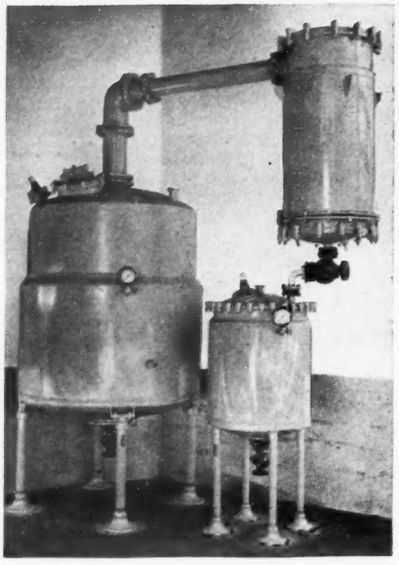
Materials Handling

More equipment will be seen at the show for handling materials than for any other unit operation of the food industries. On display will be conveyors, pumps, pipes, elevators, lift trucks, vibrating feeders and what not. A highlight will be the glass pump for



This open-type evaporating pan, equipped with welded steam jacket and clamped-on agitator, was fabricated of stainless steel by Lee Metal Products Co., Inc.

Available in stainless steel or other corrosion resistant metals, this seamless tank with cover and agitator is a product of Lee Metal Products Co., Inc.



Distillation assembly, with still, condenser and receiver, which Pfaudler Co. will include in its exhibit of processing equipment

food materials. The materials handling exhibits are as follows:

Allis-Chalmers Mfg. Co., Milwaukee, Wis.—Centrifugal pumps.

Alsop Engineering Corp., Milldale, Conn.—Pumps and conveyors.

Barrett-Cravens Co., Chicago, Ill.—A portable tilting elevator for stacking or tiering barrels or drums. Also a combination scale and lift truck which determines the weight of a load after picking it up for transfer to another point.

Beach-Russ Co., New York, N. Y.—Rotary and centrifugal liquid pumps.

Bump Pump Co., La Crosse, Wis.—Sanitary pumps, as used for dairy products, sirups, and other food liquids, will be shown in operation. Industrial pumps of other types will also be shown.

Corning Glass Works, .Corning, N. Y.—Shown only at this booth will be the Nash centrifugal pump, made of Corning glass, and adaptable to many food processes because of its sanitary features and ease of cleaning.

Eppenbach, Inc., Long Island City, N. Y.—Sanitary pumps for the handling of food products.

Farwell, Ozmun, Kirk & Co., St. Paul, Minn.—Light gage stainless steel pipe and fittings, 3 to 10 in. diameters, suitable for corrosion resisting process lines.

Jeffrey Mfg. Co., Columbus, Ohio—Recent developments in electric vibrating equipment for conveyors and feeders.

Kinney Mfg. Co., Boston, Mass.—A rotating plunger pump with steam jacket for highly viscous liquids.

Lawrence Pump and Engine Co., Lawrence, Mass.—Full-size units of the "Vortex" line of pumps.

Lewis-Shepard Sales Corp., Watertown, Mass.—Hand-operated factory trucks, various types of skid platforms, hand operated lift trucks, and hand operated stackers.

Oliver United Filters, Inc., New York, N. Y.—The Olivite acid handling pump, suitable for handling acid food liquids.

Packless Metal Products Corp., Long Island City, N. Y.—Seamless flexible metal hose and couplings available in any metal needed to resist corrosion.

Parker Appliance Co., Cleveland, Ohio—Stainless steel tubes, fittings and valves, suitable for corrosion resisting process lines.

Quimby Pump Co., Newark, N. J.—In addition to exhibiting many models of pumps of different types, the company is telling the story of its line of rotary and centrifugal pumps for the process industries through a full-color motion picture. This picture is intended to aid those with pumping problems.

Portable electric elevator, for stacking or tiering barrels and drums, which will be exhibited by Barrett-Cravens Co.

Read Machinery Co., Inc., York, Pa.—A complete materials handling system, including a new vibrating sifter and automatic dustless weighing hopper, together with such auxiliary equipment as elevators and conveyors will be shown.

Revolvator Co., North Bergen, N. J.—Portable power elevators and hand lift trucks. A large telescopic revolvable-base roll-piling portable machine will be featured.

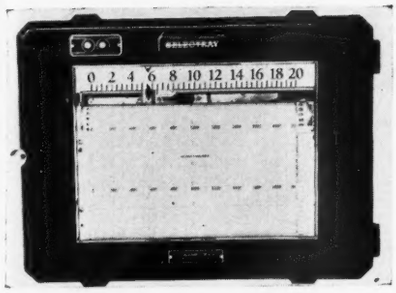
Robinson Manufacturing Co., Muncy, Pa.—Vertical screw elevator and screw conveyors used in combination with a mixer and sifter, in operation.

Stephens-Adamson Mfg. Co., Aurora, Ill.—Redler conveyor-elevators for handling powdered and granular materials in any direction. Totally enclosed, the conveyor has been used with products such as grain, beans, casein, powdered chocolate, cocoa beans, cocoa tailings, coffee, flaked cereals, flour, malt, peanuts, peas, rice, starch and sugar. Also exhibited will be a loader for box cars and the holds of vessels, used with bulk material such as grain and salt. Unit throws material, in a continuous stream, a distance of 30 ft. or more to end of car. A third materials handling unit shown is a belt conveyor carrier.

Syntron Co., Homer, City, Pa.—Vibrators for keeping material flowing freely through hoppers, bins and chutes. Also, a line of vibratory feeder conveyors for regulating the flow of bulk materials into processing machines such as dryers, cookers, mixers, etc.

Tri-Clover Machine Co., Kenosha, Wis.—A new line of fittings, valves and tubing developed for use with light-gage tubing and which are easily taken down for cleaning. Also non-agitating, non-foaming pumps which may be cleaned easily. The pumps will handle liquids containing semi-solids, as well as clear liquids.

Combination lift truck and scale to be put on display by Barrett-Cravens Co. Load is weighed while being handled



Recorder-controller for throttling electric heat to be exhibited by C. J. Tagliabue Mfg. Co. A new instrument, it utilizes a light beam without inertia to actuate the recording-controlling mechanism

Yale & Towne Mfg. Co., Philadelphia, Pa.—Electric cable hoist; electric lift and elevating truck; electric crane truck; hand lift truck.

Measuring, Controlling

Instruments for metering process variables and for regulating those variables to control quality will be seen in several of the exhibits. Instruments for determining characteristics of products and solutions, such as hardness, pH, plasticity and viscosity, in the plant and in the laboratory, likewise will be on display. There are several recent developments in these types of instruments.

Here are the exhibits where you will find measuring and controlling devices:

Bailey Meter Co., Cleveland, Ohio.—Meters and control equipment for application to process operations and steam power plants. The display will include units for the control of combustion, pressure, temperature, level and other factors.

Blaw-Knox Co., Pittsburgh, Pa.—Informational exhibit on company's automatic proportioning equipment.

Brabender Corp., Rochelle Park, N. J.—Several new types of quality-control instruments, including a recording viscosimeter for such products as dextrine, starch and flour; a hardness tester which measures and records the milling resistance of organic materials and has been used in flour milling; a recording plastometer which measures the consistency of a wide range of materials, including dextrine and starch; semi-automatic moisture tester in which moisture loss is read from an illuminated dial directly in percentage. Also, a central thermostatic unit for water temperature control in the laboratory.

Brown Instrument Co., Philadelphia, Pa.—Instruments for indicating, recording and controlling the variable factors of industrial processes, including a new line of temperature, pressure, flow and liquid level instruments. A pneumatic transmission system for meters and controllers and a multiple-recording potentiometer pyrometer will be shown.

Buffalo Meter Co., Buffalo, N. Y.—Liquid meters of volumetric displacement type for measurement of cold water, hot water, oils and chemicals. Among these will be a new unit for automatically measuring batches of a liquid.

Coleman Electric Co., Maywood, Ill.—pH meters, recorders and controllers and the "Regional Spectrophotometer", a new instrument used for such operations as determining the concentration of colored ingredients of solutions.

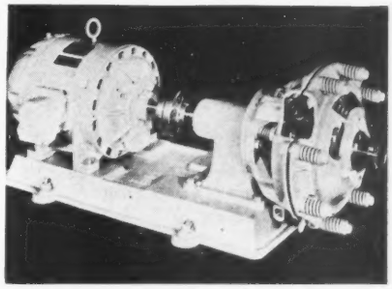
Charles Engelhard, Inc., Newark, N. J.—This company will show a large line of control instruments, including recording and indicating thermometers and gas analysis equipment.

Fischer & Porter Co., Philadelphia, Pa.—Flowmeters of the "Rotameter" type will be on display, shown for the first time equipped with precision, interchangeable, machine-made Pyrex tubes. Also shown will be precision-bore glass tubes for other control applications.

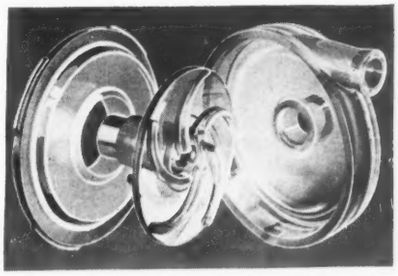
Industrial Instruments, Inc., Jersey City, N. J.—Model RD "Solu-bridge," an instrument for checking the concentration of alkali washing solutions, and Model DW "Water Tester", for continuous check on purity of distilled water or condensate will be featured. Other instruments for determining resistance, moisture content and conductivity will be included.

The Kron Co., Bridgeport, Conn.—A portable dial scale with ticket printing attachment, a dormant dial scale, a small portable pan scale and an industrial monorail scale will be shown by this company, as well as photos of automatic and semi-automatic batching scales.

Leeds & Northrup Co., Philadelphia, Pa.—This company's display will include a new instrument for controlling the production of SO_2 from sulphur burners, as well as its familiar line of measuring and controlling instruments. There will also be a new "Electro-Chemograph", an instrument for making qualitative and quantitative analyses of sugar, fermented beverages and many other products.



Assembled view of the Nash Company's glass centrifugal pump in which the parts coming into contact with the product are made of "Pyrex" glass by Corning Glass Co.



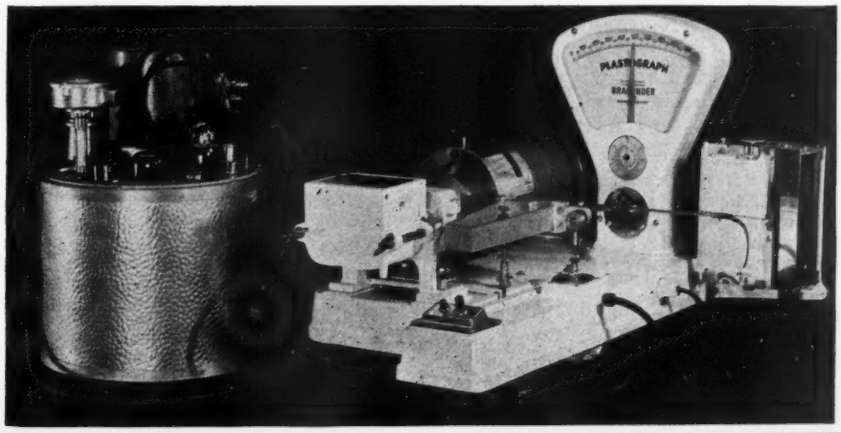
"Pyrex" glass parts of the new Nash glass centrifugal pump, disassembled to show ease of cleaning of working parts

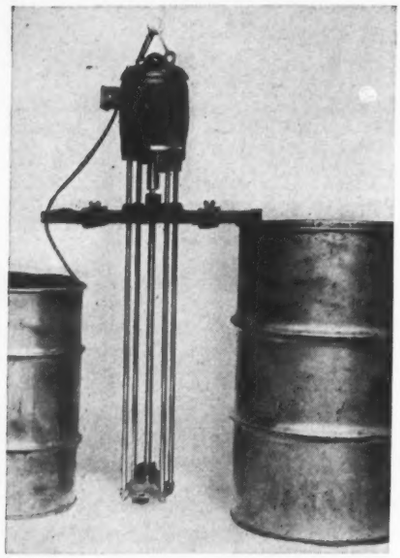
Sarco Co., Inc. New York, N. Y.—New type electric temperature regulator will be in operation, this unit being for applications requiring close control under fluctuating load, as with milk preheaters or pasteurizers. Also, a new cooling water control and water mixing valves, steam and water mixers, self-operated temperature regulators, a line of heating system specialties and steam traps.

Stephens-Adamson Mfg. Co., Aurora, Ill.—New "Tellevel" automatic storage controller to regulate the level of material in bins by starting and stopping conveyors feeding the bins. It also controls the level of liquids in tanks.

Syntron Co., Homer City, Pa.—Accurate net batch weighing machines for proportioning batches of material automatically, continuously or by manual direction. Exhibited also will be a line of continuous weigh feeders, which feed material at a constant rate by weight.

This instrument determines the plasticity of products. Called a Plastograph, it will be in the booth of Brabender Corp.





Vortex mixer, shear type, to be put on display by Lawrence Pump & Engine Co. It is made in 50 to 1,000 gal. sizes for drums

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.—Among several meters and controllers on exhibit will be many new "Celetray" pyrometers and resistance thermometers. In these, a beam of light having no inertia takes the place of the customary boom or pointer. By moving on and off a phototube, the beam controls a motor which positions the contacts of the Wheatstone bridge or potentiometer. An entirely new line of pressure-spring instruments with convenient refinements will be displayed too.

W. A. Taylor & Co., Inc., Baltimore, Md.—Equipment for determining pH, and chlorinated and phosphate content by using a color indicator and comparator. Water analysis equipment and a pH electrometer (glass electrode) will be in the exhibit.

Taylor Instrument Cos., Rochester, N. Y.—A working model of a time-schedule controller will highlight an exhibit of temperature, pressure, flow, level and humidity meters and controllers.

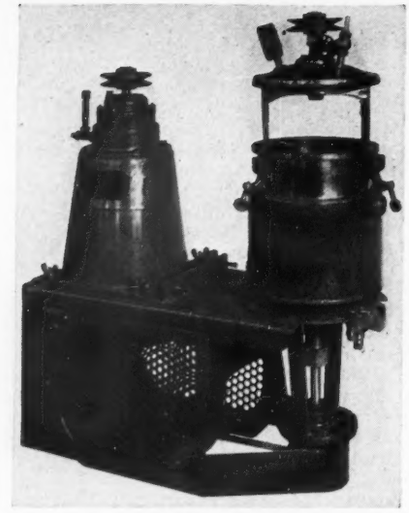
Toledo Scale Co., Toledo, Ohio—Thirty different types of scales will be shown. All have a practical use in the process industries for weighing, counting, checking and batching operations.

The Torsion Balance Co., New York, N. Y.—A line of analytical balances and torsion laboratory scales.

Wheelco Instruments Co., Chicago, Ill.—Temperature control instruments will be shown, including a new recording controlling thermometer using the radio principle, for all low temperature work.

Mixing

Since mixing enters so extensively into the operations of the process industries, there will be many exhibits of this type of equipment. Listed below, the mixing machines include those for agitating, stirring, blending, beating, dispensing, emulsifying, homogenizing, kneading, whipping and working.



Mixer in which liquids are circulated by centrifugal force, to be exhibited by Abbe Engineering Co. It has been employed to obtain uniformity in mixing sirups, etc., with milk and other liquids

Abbé Engineering Co., New York, N. Y.—Mixer utilizing centrifugal force developed by a disk with curved radial ribs; said to give high uniformity in mixing such products as sirups, jellies and chocolate with milk or other liquids and to cut operating time.

Alsop Engineering Corp., Milldale, Conn.—Production-size mixing machines, mixing tanks and portable mixers.

Blaw-Knox Co., Pittsburgh, Pa.—Informational exhibit on company's blenders for granular materials.

Eppenbach, Inc., Long Island City, N. Y.—Homogenizers and emulsifiers for food products will be shown in an exhibit featuring the "Homo-mixer" for mixing without the incorporation of air.

Lawrence Pump and Engine Co., Lawrence, Mass.—Two types of portable mixers will be shown, the "Fountain" mixer and the "Shear" mixer, adaptable for use in tanks or drums.

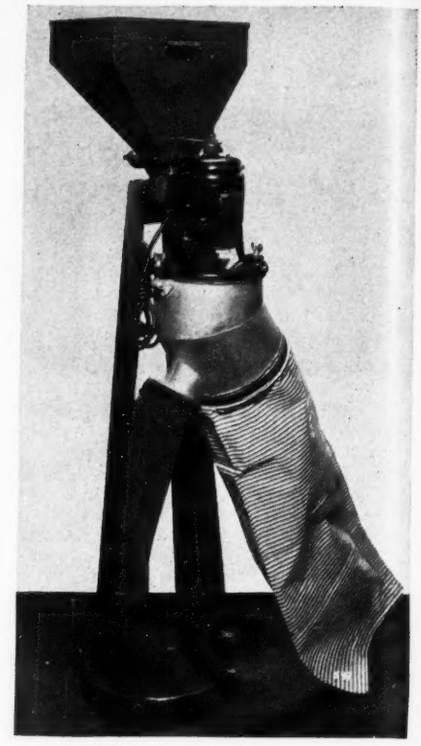
J. M. Lehman Co., Inc., Lyndhurst, N. J.—A jacketed mixing machine equipped with mixing blade suitable for stiff pastes.

New England Tank and Tower Co., Everett, Mass.—Agitators for tank mixing and the "Nett-co Continuous Mixer," a new device which mixes by dividing flow, mixing liquids while in transit in a pipe line.

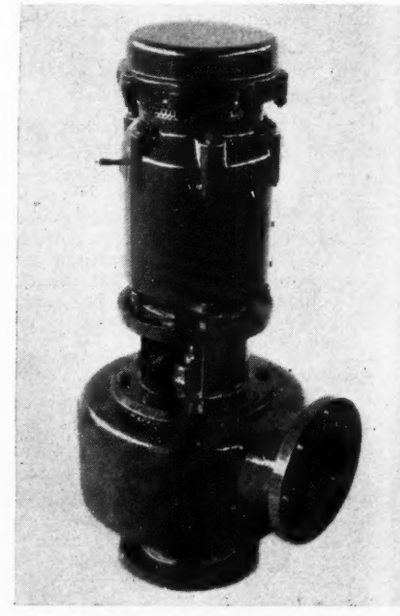
Mixing Equipment Co., Inc., Rochester, N. Y.—Cut away models of direct and geared drive portable and side entering mixers will be shown, together with a colored moving picture of mixing operations.

Ransome Concrete Machinery Co., Dunellen, N. J.—Industrial mixers for dry materials, of dust-proof design, will be shown.

Read Machinery Co., Inc., York, Pa.—A new vacuum mixer, a new laboratory mixer and a new "streamlined" vertical mixer. The vacuum mixer, of 15-gal. capacity, has a mixing bowl and arms of stainless steel. Easy dismantling and cleaning are features of the laboratory mixer. The vertical mixer has a specially designed steam jacketed bowl for applying heat during the mixing operation.



Small sifter to be among the machines in the booth of Abbe Engineering Co. This type of unit has been used on such foods as sugar, cocoa and flour



The "Nettco" continuous mixer, made by New England Tank and Tower Co., mixes liquids directly and continuously while they are in transit

Robinson Manufacturing Co., Muncy, Pa.—A combined mixer and sifter, the mixer being entirely of stainless steel and used in combination with elevators and conveyors to a "gyro-sifter." This combination will be mixing, elevating, conveying and screening a product to show the efficiency of the equipment.

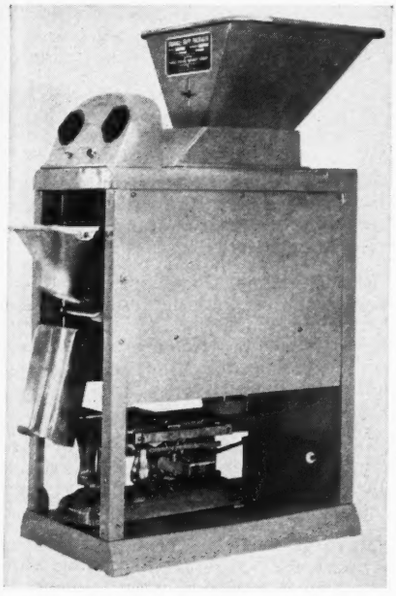
The Turbo-Mixer Corp., New York, N. Y.—Display of working models for mixing liquids with liquids, solids or gases.

Sprout, Waldron & Co., Inc., Muncy, Pa.—The horizontal mixer to be shown was developed for the food industry. It is of the ribbon and paddle type, made without crevices, collars, screws or other obstructions for easy, thorough cleaning.

Packaging

As is to be expected, seeing that nearly every product of the process industries must be put into some form of container, a wide selection of machines for this unit operation will be on display. Many of the units are specifically designed for foods. One of particular interest, because it is new, weighs and fills into containers such items as potato chips, which normally are packaged by hand. The exhibits are as follows:

Something new in packaging equipment to be exhibited at the show by Triangle Package Machinery Co. It fills into containers such products as potato chips, marshmallows, often packaged by hand.



Acme Steel Co., Chicago, Ill.—The latest and fastest of the company's box strapping devices will be in operation. There will also be tools for bracing carload freight and stapling wire for stitching fiber and corrugated containers.

Alsop Engineering Corp., Milldale, Conn.—Manually operated and semi-automatic bottle fillers, combination air cleaner and bottle filler, label gluer and portable screw bottle capper.

Associated Cooperage Industries of America, Inc., St. Louis, Mo.—Motion picture showing manufacture of barrels; exhibit will be various types and sizes of barrels.

Beach-Russ Co., New York, N. Y.—High-vacuum pumps that can be used in vacuum packaging.

Bemis Bros. Bag Co., St. Louis, Mo.—Tape sealer used for closing open-mouth multiwall bags of the type in which many food products are packed.

Cleveland Container Co., New York, N. Y.—This company will exhibit cylindrical, cellophane-lined containers for food products, special containers for cheese, transparent display containers and adhesives for packaging.

Economic Machinery Co., Worcester, Mass.—Several models of the "World" labeler will be on view, including: Model HS, automatic "Straightaway" labeler; and Model CH, semi-automatic labeler. Both of these machines are for the labeling of bottles.

Horix Mfg. Co., Pittsburgh, Pa.—Several models of filling machines will be shown, including Model HEV-14, a 14-valve automatic feed and discharge rotary filling machine of the gravity-vacuum type, and Model TV, a new portable vacuum filler. Also to be shown are an ultra high speed filler handling 150 qt. bottles per minute, Model HAV-32; and Model HS-18, a rotary can filler.

Karl Kiefer Machine Co., Cincinnati, Ohio—Bottle and can filling equipment, capping equipment, tube filling equipment and the "Bottoms-Up" bottle cleaning machine.

Kinney Mfg. Co., Boston, Mass.—New compound high vacuum pumps for absolute pressures below 1 micron. Also, single-stage vacuum pump.

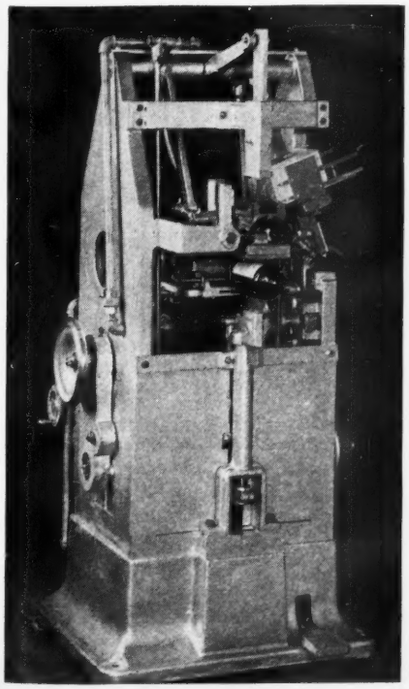
New Jersey Machine Corp., Hoboken, N. J.—Automatic and semi-automatic labeling machines, label gummers and compressors for producing air pressure or vacuum for labeling machines will be shown.

Pneumatic Scale Corp., Ltd., Quincy, Mass.—Featured by this company will be an operating "Streamlined Filler" for automatic filling of all sorts of liquids into bottles. There will also be information on the complete line of packaging and filling machinery.

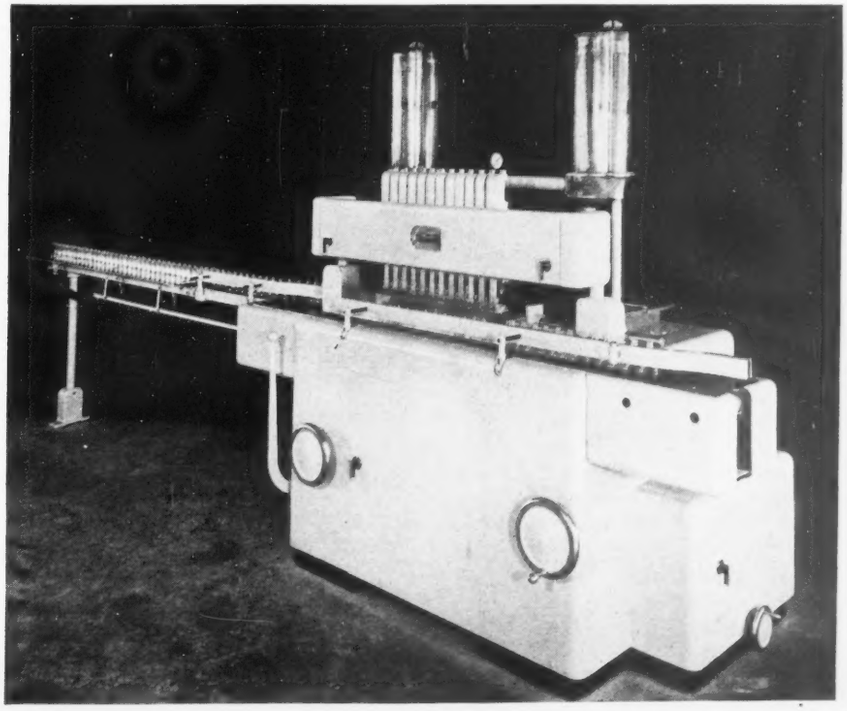
Pressed Steel Tank Co., Milwaukee, Wis.—A line of seamless cylinders and returnable shipping containers, including removable-head drums and barrels. In addition, special seamless drawn shells and special shapes are to be shown.

St. Regis Paper Co., New York, N. Y.—Multi-wall paper valve bags, in 25 to 100-lb. sizes, and automatic equipment for filling these bags. Used for such foods as sugar, salt and flour, the bags are closed at both ends at the factory except for a small open-

Model CH, "World" labeler, made by Economic Machinery Co., is a semi-automatic machine in which the bottles are placed and removed by hand, but all other operations are automatic



Automatic filling of various sizes of bottles is accomplished at high speeds on this new streamlined filling machine of Pneumatic Scale Corp., Ltd.



ing, or "valve," in one corner for filling. This valve is self-closing after the bag is filled.

Sprout, Waldron & Co., Inc., Muncy, Pa. — An all-electric compression packer for packing flour and similar free-flowing materials into bags or barrels. Rapid operation is claimed.

Stokes & Smith Co., Philadelphia, Pa.—"Transwrap" automatic packaging machine which forms packages from transparent cellulose, Pliofilm or other heat sealing material in roll form, fills the packages and heat-seals them top and bottom. The material may be either printed or unprinted. The machine has been used for packaging candy, nuts and other small articles.

Triangle Package Machinery Co., Chicago, Ill.—A newly developed "Elec-Tri-Pak" unit which weighs and fills into containers such items as potato chips, noodles, marshmallows, cookies and candies normally packaged by hand. Another Triangle exhibit will be a volumetric filler suited for measuring small amounts of free flowing food products.

Wheeling Corrugating Co., Wheeling, W. Va.—Single trip steel containers for foods and other products.

Power Application

Among a number of devices on exhibit for transmitting power from motors to machines will be a new all-electric adjustable speed drive for alternating-current circuits. The roster of exhibits of this type follows:

Allis-Chalmers Mfg. Co., Milwaukee, Wis.—Speed changers, motors and "Tex-rope" drives.

Falk Corporation, Milwaukee, Wis.—Speed reducers and flexible couplings will be shown by this company, including a right angle drive reducer.

Reeves Pulley Co., Columbus, Ind.—Several different sizes, designs and controls of the company's variable-speed transmission, variable-speed motor pulley and variable-speed motor drive. These units provide adjustable machine speeds.

Reliance Electric & Engineering Co., Cleveland, Ohio—New all-electric adjustable-speed drive for alternating current circuits, also explosion-proof motors.

Stephens-Adamson Mfg. Co., Aurora, Ill.—Speed is controlled by turn of a handwheel in the JFS variable speed and reducer transmissions to be shown. This unit, located between the driving motor and driven machine, is of the planetary gear type. Speed reducers for conveyor, etc., will also be exhibited.

Separating

Under the unit operation of separating comes a multitude of machines used in the food industries. These include centrifuges, filters, sifters, precipitators, air cleaners, magnetic separators and gravimetric separators. The latest designs in this type of equipment will be found in the exhibits enumerated below.

Centrifugal for clarifying chocolate, to be in the exhibit of American Laundry Machinery Co. It has a productive capacity of about 3,600 lb. per hour

This 12 in. laboratory size centrifugal was made by Fletcher Works for experimental operations and pilot plant works requiring an exact duplicate of full-sized centrifugal machines

Abbé Engineering Co., New York, N. Y.—Turbine sifter which has found extensive use on sugar, cocoa, special flours, baking powder and similar products.

Ace Glass, Inc., Vineland, N. J.—Line of fiber-glass filters.

Allis-Chalmers Mfg. Co., Milwaukee, Wis.—Heavy-duty low-head gyrating sifter. It has unusually large capacity, though occupying a space of only 3x3½x3½ ft.

Alsop Engineering Corp., Milldale, Conn.—Water filters, internal-pressure filters, high-pressure filters, asbestos disk filters and filtering materials.

American Air Filter Co., Inc., Louisville, Ky.—In actual operation will be a dynamic precipitator which sprays water into dust-laden air, then separates the dust and water from air stream by centrifugal force; and also an electrical air filter incorporating electrical precipitation with a viscous impingement filter. Other air filters will be shown.

The American Laundry Machinery Co., Rochester Engineering & Centrifugal Division, Cincinnati, Ohio—Underdriven chemical centrifugal for clarification, thickening, classifying and filtering, made of corrosion resistant material. Also, a laboratory centrifugal and three bottom-discharge centrifugals of different types. All equipment will be electrically connected for actual operation.

American Machine and Metals, Inc., Tolhurst Centrifugal Division, East Moline, Ill.—Several types of centrifugals, including suspended, solid curb, center slung and laboratory type center slung units.

American Seitz Filter Corp., New York, N. Y.—In operation will be a tank filter, complete with an automatic Filter-Cel feeding device. Other items on display will be a sheet filter with 50 frames and a new unit which can be used as a single disk machine or enlarged to accommodate eight frames.

Baker Perkins Co., Saginaw, Mich. The ter Meer continuous centrifugal for separating free-draining solids from liquid slurries.

Bird Machine Co., South Walpole, Mass.—Continuous centrifugal solid bowl filter which handles solids varying in size from ⅜ in. mesh to a fraction of a micron. Filter screens and cloths are eliminated.

Dings Magnetic Separator Co., Milwaukee, Wis.—Equipment for the determination of the presence of iron or other magnetic material in other substances, and for its removal.

Dorr Co., New York, N. Y.—The newly developed Squarex clarifier with a built-in flocculation compartment. It is made for installation in square sedimentation tanks. The rake mechanism is equipped with a special automatic arm that reaches out into the corners.

Fletcher Works, Philadelphia, Pa.—A 40 in. direct motor driven suspended centrifugal with "heavy duty" unloader and "Centoid" speed control to provide unloading speed of 50 r.p.m., also, a high speed 24 in. centrifugal with speed of 1,750 r.p.m. In operation, there will be a 12 in. laboratory model centrifugal with separator type basket.

Great Western Mfg. Co., Leavenworth, Kan. — Gyratory screening machine, for dry and wet screening; automatic sifting machine for dry materials where more than one separation is desired or large capacity is required (used on starch, sugar, cocoa, etc.); a laboratory sifter arranged to take a total of sixteen receptacles at one time; a bolter and rebolter for large capacities; and a dustproof sifting and mixing machine.

Hydraulic Press Mfg. Co., Mount Gilead, Ohio—Information will be available at exhibit on equipment for separating fats and oils from solids.

Jeffrey Mfg. Co., Columbus, Ohio—Recent developments in electric vibrating equipment for screens, includ-

ing a screen with stainless steel wires under high tension in one direction and no cross wires. The tightly stretched wires develop a resonance said to have the property of passing undersized particles more readily than conventional screens.

Louisville Drying Machinery Co., Louisville, Ky.—The Louisville-Wright cord filter, a continuous, self-cleaning filter with applications in many food industries.

Monarch Mfg. Works, Inc., Philadelphia, Pa.—Water sprays used in air washing, scrubbing, humidifying and air conditioning installations.

Motor Improvements, Inc., Newark, N. J.—"Purolator" filter, type G-126, new all-metal filter designed for food products and similar materials.

Newark Wire Cloth Co., Newark, N. J.—Improved type of End-Shak testing sieve shaker, with an automatic time switch.

Oliver-United Filters, Inc., New York—Two recently developed types of filters. One is the Precoat filter, which is being used on food products. The other is a low-submergence, low-discharge type for which faster operation, higher efficiency, better washing, and elimination of practically all wear on cloth are claimed.

Orville Simpson Co., Cincinnati, Ohio—Improved design of screener of the large-capacity gyrating type.

Pangborn Corp., Hagerstown, Md.—An operating assembly of a dust collector and exhauster will be on display.

Productive Equipment Corp., Chicago, Ill.—An 18x48 in. single-deck stainless steel "Selectro" screen for soups, catsups and similar products, also working models of a new type of screen not yet announced.

Raymond Pulverizer Division, Combustion Engineering Co., Inc., Chicago, Ill.—An operating model of a mechanical air separator for use in grinding operations, also a laboratory size mechanical air separator.

Separations Engineering Corp., New York, N. Y.—Materials are separated by differences in their specific gravities, even though they are of same size, by the Sutton, Steele & Steele, Inc., air table exhibited. This is used in plants handling sugar, seeds, wheat germ, spices, coffee, cocoa, nuts, beans, peas, and so forth. On exhibit also will be the "Electro-Float" which separates materials of different electrical conductivities, and has been applied in food industries to taking mouse dirt out of seed. Other equipment to be exhibited includes the Exolon multi-form grader for very close grading and sizing, a model of which will be in operation, and the Exolon high intensity magnetic separator.

The Sharples Specialty Co., Philadelphia, Pa.—New models of commercial centrifuges, a new 60,000 r.p.m. laboratory super-centrifuge for concentrating filterable viruses, and a new high-capacity Super-D-Hydrator which develops 2,500 times the force of gravity and which is used for extracting various crystals.

T. Shriver & Co., Harrison, N. J.—Several foods will be included among an exhibit of unfiltered and filtered products, these products running the gamut from various sirups to extracts, wine, cocoa butter, beverages and so forth. Then there will be an action picture display of the principles of operation of a Shriver filter and, on the floor, a small portable filter of the type used in the food industries.

Sprout, Waldron & Co., Inc., Muncy, Pa.—A screen sifter, the sifting area of which has a true circular movement. The screen may be had in stainless steel, aluminum or other non-corrosive metals.

Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.—An improved mechanical air separator which operates in a closed circuit with a pulverizer of almost any type.

Storing

Because of the nature of their materials, food processors are interested in corrosion resistant tanks and vats for holding ingredients and products. Several of these may be seen at the show, as indicated in the following list of exhibits. Among the items displayed will be two new corrosion resistant linings for vessels and process equipment.

Farwell, Ozmun, Kirk & Co., St. Paul, Minn.—Stainless steel tubs or vats of 15 and 20 gal. capacity, for use in canning and meat packing plants, will be shown. Also stainless steel tanks of 50 to 500 gal. capacity.

Lee Metal Products Co., Inc., Philipsburg, Pa.—Corrosion resisting tanks of stainless steel, nickel and Monel metal, and special food processing equipment will be shown.

Metal Glass Products Co., Belding, Mich.—Stainless steel tanks, with and without agitators and heating coils, also Monel metal tanks.

The United States Stoneware Co., Akron, Ohio—Two new corrosion resistant linings for tanks and process equipment. One is "Tygon," a synthetic rubber. The other is "Resilon." Both are non-toxic and said to be resistant to all corrosive materials of the food field. In addition, the company will exhibit a new line of stoneware tanks and containers made of "Ceratherm," a new heat-resistant body.

Unclassified

Some of the exhibits at the exposition do not fall under any of the foregoing classes of unit operations. So they are listed here. Irradiating equipment, compressor valves, a vegetable oil deorodizer, materials of construction for food equipment and other items are included.

Blaw-Knox Co., Pittsburgh, Pa.—Informational exhibit on company's vegetable oil deodorizers.

Falstron Co., Passaic, N. J.—Dust control equipment, including a unit dust collector.

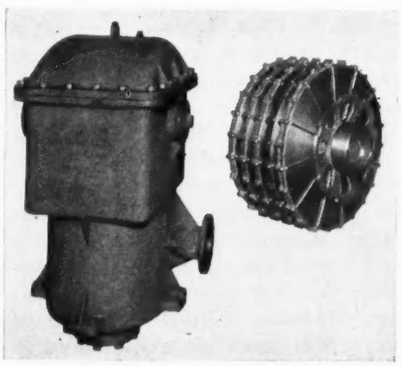
Hanovia Chemical & Mfg. Co., Newark, N. J.—Irradiating equipment of the quartz tube mercury arc type, as used in production of vitamin D milk, also ultra violet sterilizing lamps for air conditioning ducts. In addition, a line of fused quartz tubes and other shapes.

Heil & Co., Cleveland, Ohio—Corrosion resisting materials, including plastic tank linings, metal coatings; also heating coils, tanks and other equipment made of Monel metal and other corrosion resisting metals, will be shown.

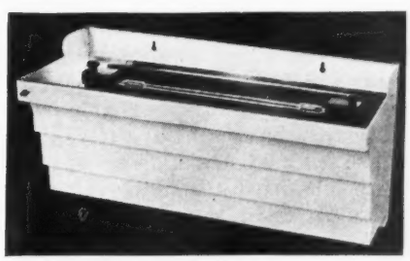
L. O. Koven & Bro., Inc., Jersey City, N. J.—A wide variety of food processing equipment will be shown by enlarged photographs, including mixers and cookers. Two or three stainless steel and copper alloy units will be on exhibit.

Lukens Steel Co., Coatesville, Pa.—Nickel-clad steel and other corrosion resisting clad-steels, with pictures of food equipment made from these metals, will be on display.

J. H. Voss, Inc., New York, N. Y.—High-speed ringplate valves for ammonia, air and gas compressors, also liquid ammonia float valves of new design.



This industrial type filter, made by Motor Improvement Co., contains the filtering element shown at right in which filtering is accomplished through five disks, each made up of coils of steel ribbon, wound like watch springs



Air is sterilized by this "Safe-T-Aire" ultra-violet lamp, which will be in the exhibit of Hanovia Chemical & Mfg. Co. It is hung on side walls of room

New Method for
PREVENTING OIL SEPARATION

Addition of small quantity of glycerine to peanut butter prevents separation of oil and makes finer grinding of peanut solids practicable.

By C. W. LENTH
Miner Laboratories, Chicago, Ill.

▶ ***Research to develop new uses for products or byproducts of one industry often results in new or improved products for other industries. An example of such an occurrence is given in this article, in which the author tells how experiments carried out to develop new uses for glycerine resulted in the development of a method for preventing the separation of mixtures of oils and solids-not-fat.***

This demonstration of a new use for glycerine, carried out on peanut butter, may suggest helpful solutions to other problems in the manufacture of

Dairy Products
Fats and Oils
Margarine
Meat Products
Processed Nuts
Salad Dressings
Soups
Other Food Products

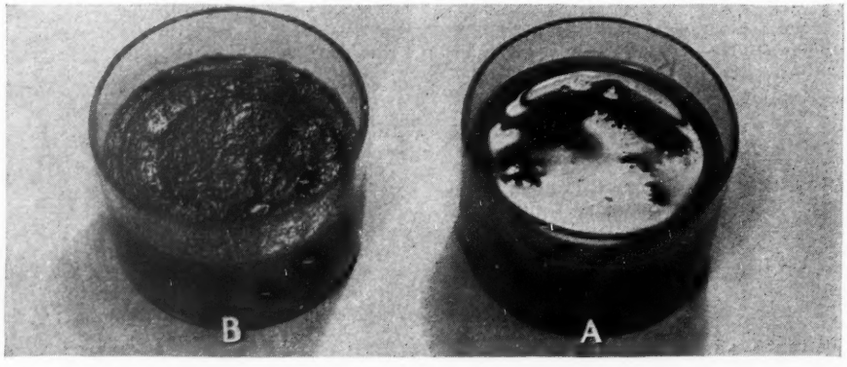


Fig. 1. Effectiveness of 1.5 to 2.0 per cent of glycerine in peanut butter to prevent oil separation while standing at room temperature is shown by absence of oil layer on surface of sample B.

THROUGHOUT the field of food manufacture and processing there is constant search for new ways of using familiar commodities as well as for developing new products.

Increased market demand for the particular commodities is not always, although generally, the direct incentive for the search. The search may be in the interest of determining properties and behaviors not previously known, which, in turn, might stimulate the adoption of new or improved methods of manufacture and lead to increased output from the traditional raw materials with an indirect result of widening the potential market for the commodity.

Often this search for new uses for one commodity leads to the solution of a production or quality improvement problem that is troubling the manufacturers of another product. This latter accomplishment is one of the results of our study to learn more than was already known about the properties of and possible uses for glycerine in food manufacturing.

We found that the addition of from as little as 0.5 per cent to as much as 5.0 per cent by weight of glycerine to peanut butter prevents separation of the oil from the ground peanut solids. In addition, we learned that peanut butter containing glycerine can be ground to a finer and smoother consistency. Also, we found that it has improved eating qualities. Peanut butter containing glycerine has a lowered tendency to stick to the roof of the mouth, and is not so dry and cloying to the palate. Usually from 1.5 to 2.0 per cent of added glycerine gives the desired results. When the butter is made from peanuts exceptionally high in oil or when the butter is to be used as a filling for confectionery or bakery goods, the addition of as much as 5.0 per cent of glycerine may be necessary.

The tendency of the oil to separate is so well known that many manufacturers of peanut butter state on their labels that the butter should be stored at low temperatures to reduce the oil separation and should be mixed or stirred to re-incorporate the oil, if it has separated. Others have added varying quantities of hydrogenated oils or hard fats to inhibit peanut oil separation. One manufacturer has gone to the extreme of separating a portion of the peanut oil, dissolving mono- or di-glycerides of fatty acids in it, and reincorporating the treated oil (U. S. Patent No. 1,926,369).

These procedures involve additional processing equipment and do not materially overcome the tendency of the butter to stick to the roof of the mouth when eaten. Attempts to overcome this so called stickiness have been made through the addition of sugars and honey, as well as through coarse grinding of the peanuts.

The result of our studies has shown that through the addition of glycerine in quantities varying according to the effect desired and the oil content of the peanuts used, a finely ground,

smooth peanut butter can be made without oil separation even upon long standing and upon exposure to high storage temperatures.

Visual evidence of the effect of adding glycerine is shown in Fig. 1. The glycerine-free sample on the right (A) has a pronounced layer of separated oil on its surface. The glycerine-containing sample on the left (B) has no such layer of separated oil although made from the same lot of peanuts in the same manner and held at the same temperature for the same length of time.

The effect of the addition of glycerine upon the plasticity of peanut butter is indicated in Fig. 2. At the outset of the test, both samples were of the same size and shape. At the end of one week, the glycerine-free sample (A) on the left has lost its original shape with unmistakable evidence of oil separation. The glycerine-containing sample (B) on the right shows no evidence of plastic flow nor of oil separation.

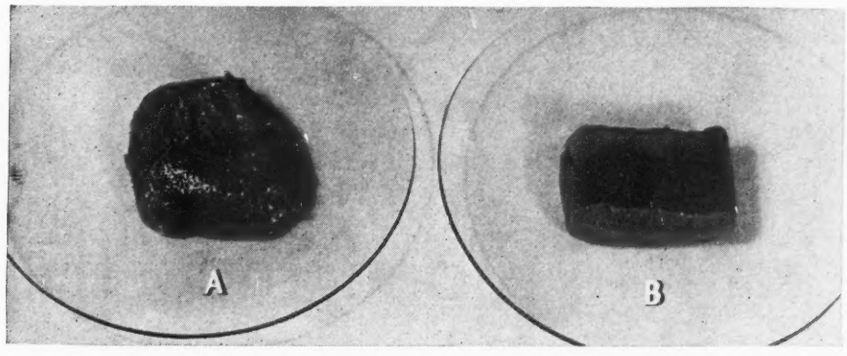


Fig. 2. Retention of original shape when exposed for a week upon a watch glass at room temperature indicates definite reduction of plastic flow in peanut butter, (B), containing low percentage of glycerine.

An exaggerated effect of the significance of adding glycerine to peanut butter is illustrated in Fig. 3. Equal quantities of glycerine-free (A) and glycerine-containing (B) peanut butter of otherwise identical composition were centrifuged to determine to what extent the glycerine is effective under drastic treatment to obtain oil separation.

In practice the glycerine may be mixed with the peanut butter or it may be added to the peanuts before or during the grinding operation. The results obtained differ somewhat with the manner of application. The maximum beneficial effect is obtained when the glycerine is added to the peanut butter after grinding. The effect becomes noticeable as soon as the glycerine is thoroughly mixed into the peanut butter. The butter becomes appreciably stiffer, the oiliness entirely disappears, and the stickiness is surprisingly reduced.

When the glycerine is added to the peanuts before grinding or during the grinding operation, the effect of the glycerine upon the resulting peanut butter is less marked. The butter retains the appearance of peanut butter made in the usual manner but there is a reduction in the separation of oil on standing and in the tendency of the butter to stick to the roof of the mouth upon eating, but not to such an extent as when the glycerine is added after grinding. To obtain the maximum benefit by adding the glycerine after grinding additional equipment will not be necessary in many plants because the type of mills used in those plants are so designed that the peanut butter is mixed to insure homogeneity after grinding by being forced through a perforated plate. In such plants, the glycerine may be easily added to the peanut butter at the hopper of the second stage of the mill. In other plants, the peanut butter is run directly into the hopper that feeds to the filling machine. When that is done, the glycerine may be added in the hopper of the filling machine. Under those circumstances it will be necessary, however, to install a simple mixing device or agitator, if none is being used.

When the glycerine is used in the recommended small amounts it has no noticeable effect on the taste of the finished peanut butter. Of course, when large amounts are used, the glycerine may impart sweetness to the butter in proportion to the quantity of glycerine used. Since glycerine is not ordinarily subject to fermentation or bacterial spoilage, there is no danger of the development of an off flavor. This statement has been borne out by samples stored as long as ten months without showing any tendency to develop an off flavor or to lose the effectiveness of the glycerine in preventing oil separation.

The effect of glycerine in bringing about oil retention by peanut butter is difficult to explain and, in fact, is surprising because the glycerine is not a solvent for either the oil or the peanut solids. It apparently forms a stable emulsion with the oils and solids of the peanut butter. This emulsion seems to be of the type in which two immiscible liquids, glycerine and oil, are emulsified by the finely ground peanut solids.

Through the years, glycerine has not been an unknown as an edible food ingredient. Its virtue as a moisture and flavor retaining agent in such industries as cake and biscuit manufacturing, flavoring extract making, icing making, and meat curing is well known.

Nutritional investigations indicate that glycerine has a nutritive value similar to that of starch or sugar. Studies reported in the American Journal of Physiology, Vol. 103, 1933, pages 517 to 534, indicate that a substantial proportion of the normal carbohydrate intake of the human body may be substituted for by glycerine without any undesirable effects or loss of body weight.

The commercial importance of this new use of glycerine is indicated by the fact that as much as 100,000,000 lb. of peanut butter is made annually in the United States alone.

The product and method of production are covered by a recently granted U. S. Patent No. 2,166,806.

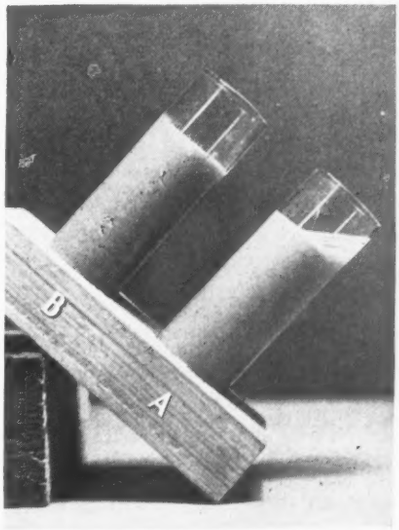


Fig. 3. Severe treatment by centrifuging fails to cause any appreciable separation of oil in glycerine-containing peanut butter, (B).

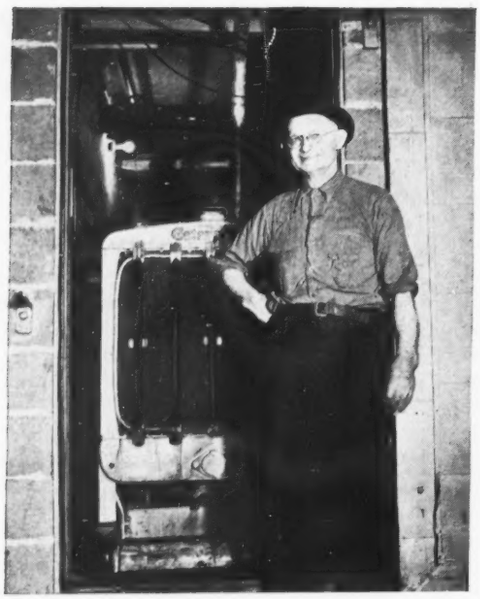


Fig. 1—This diesel engine is installed in the Zehner Packing Co., Bellevue, Ohio, where it drives a compressor providing refrigeration for the meat cooler shown in Fig. 2. Its fuel consumption averages less than 2 gal. per hour.

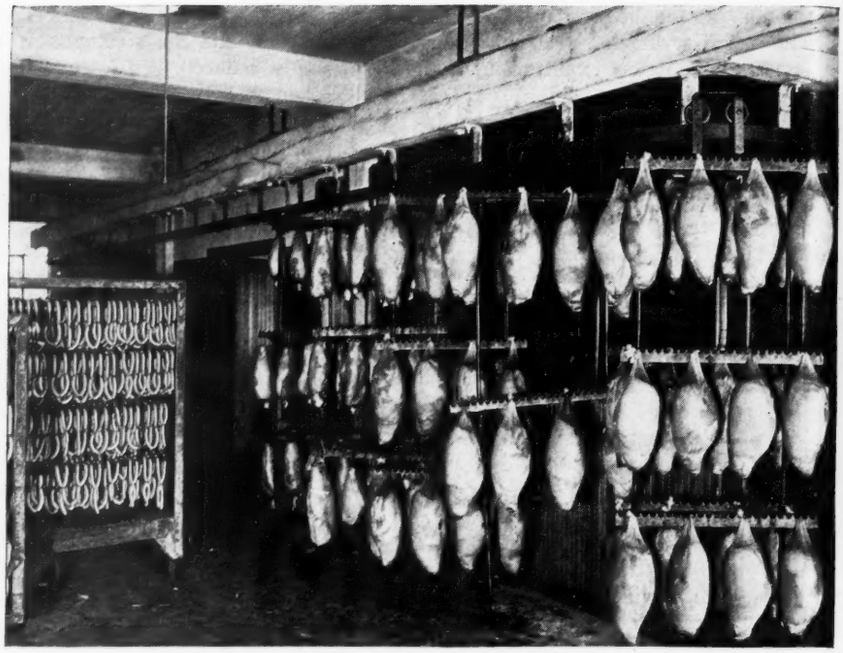


Fig. 2—View in the meat cooler at Zehner Packing Co., Bellevue, Ohio, which is cooled by refrigeration from an 8x8 in. compressor operating 18 hours per day at summer load and 8 to 10 hours per day during the remainder of the year.

DIESEL ENGINES *Provide Power* For Many Food Industries

IN THE PICTURES on this and the opposite page are shown several recent installations of diesel engines in food plants. Diesel power is finding increasing acceptance in the food industries where, in many different types of plants, its reliability, simplicity and economy of performance have been demonstrated. The installations shown on these pages are only a few of many that have been made in recent years, but they serve to illustrate the wide range of food producing activities in which the modern diesel engine now serves.

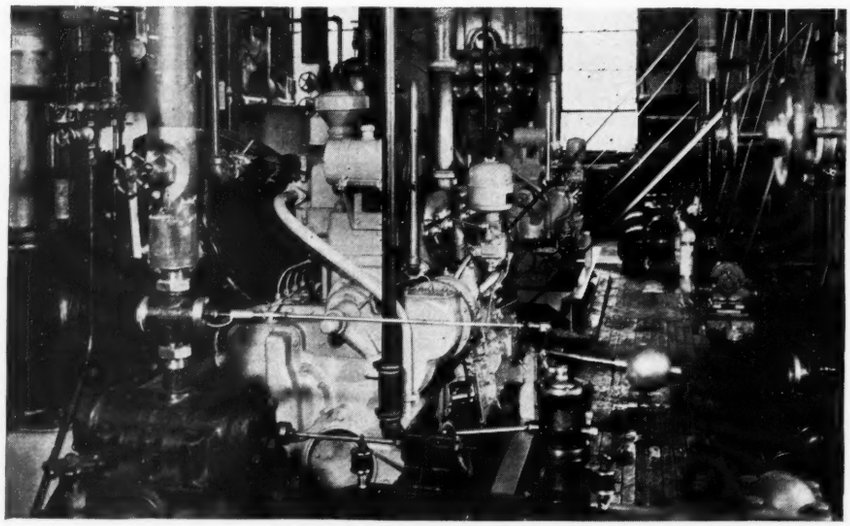


Fig. 7—Two diesel engines at Pond Village fish freezing plant operate 24 hours daily and consume 4 gal. of fuel per hour, driving two 9x9 in. refrigeration compressors, two brine pumps with 300 gal. per minute capacity each, and two water pumps, each of 250 gal. per minute capacity.

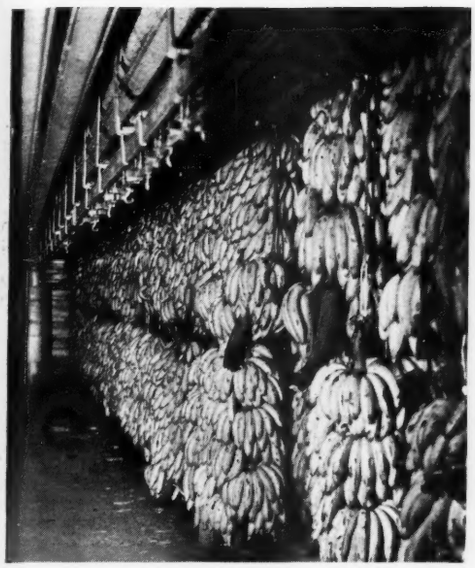


Fig. 3—This banana storage at Hunt Bros. Produce Co., St. Joseph, Mo., is one of six cold storage rooms in that plant, cooled by refrigeration from a 10-ton ammonia compressor, driven by a diesel engine which also operates a 20 kva. generator that supplies all needed light and power.

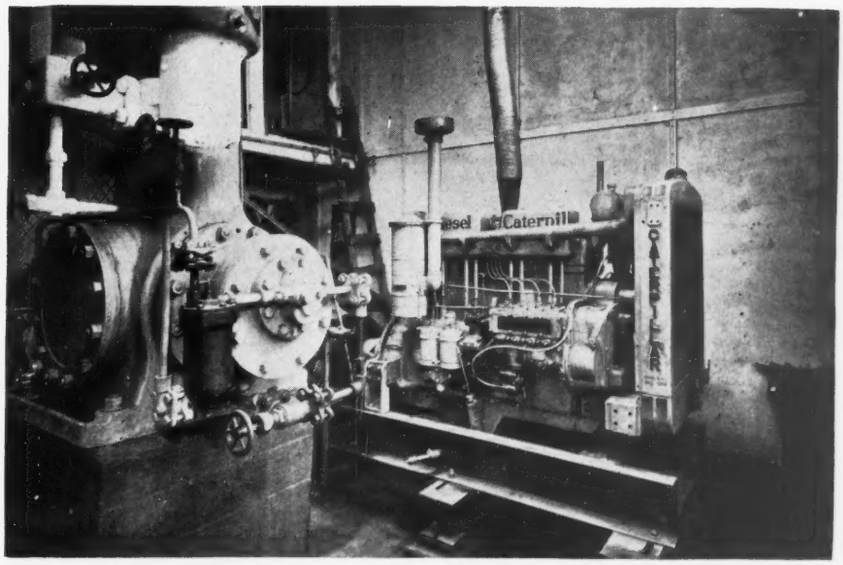


Fig. 4—This diesel installation is in the plant of A. J. Krecker Co., Chicago, Ill. The engine is belted to a twin 6½x6½ in. ammonia compressor which is used to cool a 50x60 ft. room and a 25x50 ft. room (shown in Fig. 5) to 32 deg. F. The engine runs almost continuously and consumes 1½ gal. of fuel per hour.

Economy Plants

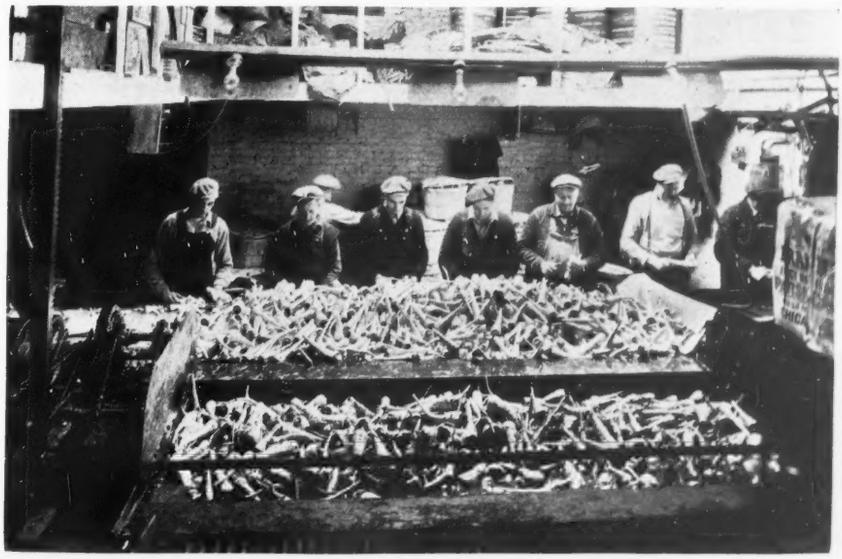


Fig. 5—One of the rooms at the A. J. Krecker plant in Chicago which is cooled by a diesel-driven refrigeration machine. This concern specializes in the preparation, packaging and storing of vegetables.

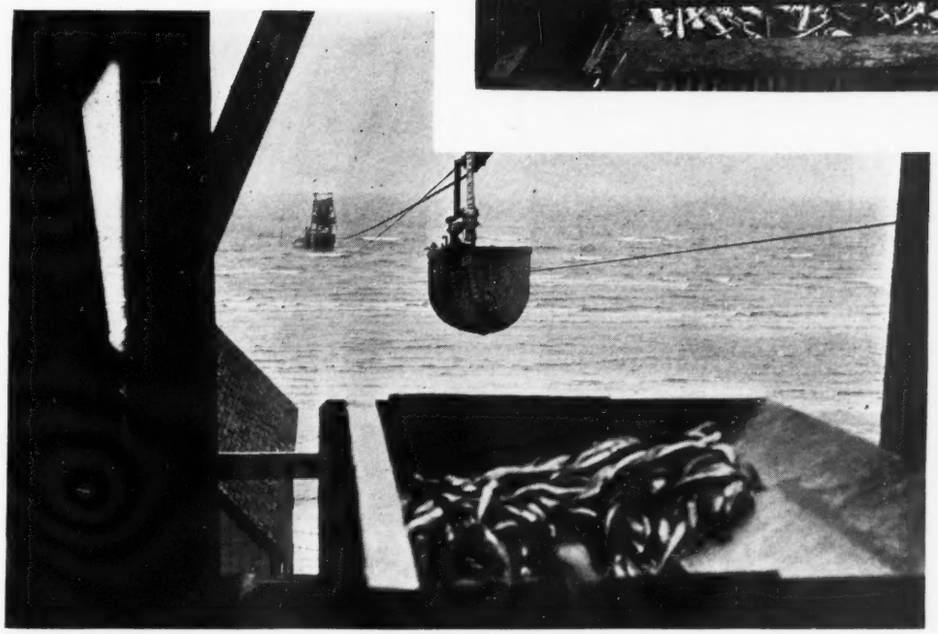


Fig. 6—Fish being unloaded at the fish freezing plant of Pond Village Cold Storage Co., North Truro, Mass., where boats cannot approach the shore and fish are brought to the plant by aerial tramway.

ATTRACTIVE TRUCKS *Build Business*

Modern design of ivory-colored bodies has high advertising value

WHEN George E. Drake started his bread and cake business in Pittsburgh, Pa., on Nov. 23, 1937, one of his most important business assets was a brand new fleet of thirteen Dodge delivery trucks. Today, two years later, the fleet has been increased to 23 trucks of the same make and size. Mr. Drake's long experience as the manager of the Ward Baking Co. plants at Boston and New York enabled him to turn out a quality product within competitive cost limits. But the manner in which he operates his fleet of trucks has contributed to this success. The trucks have bodies so designed, painted and lettered as to have high advertising value at no excessive cost. The driver-salesmen are carefully selected and closely supervised, and they are supplied with sanitary uniforms.

Both bread and cake are sold to wholesale outlets such as stores, delicatessens, schools, colleges, restaurants and dairy stores. Seventy-five per cent of the company's business is in Pittsburgh and the balance in nearby towns within a radius of 35 miles. Some bread is also shipped by express to towns as distant as 150 miles.

Whenever a new account is obtained, every effort is made to make it an exclusive Drake outlet with no other brands of bread or cake sold at the same time. This eliminates competition. Today, 60 per cent of the company's business is on this basis.

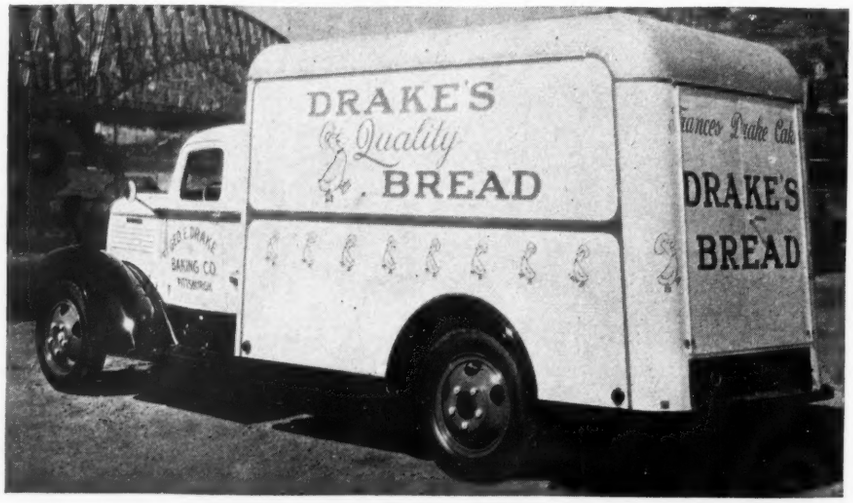
The truck routes are laid out for one-man operation. In the city, the routes average 30 miles per day; in the outlying territory, 80 miles per day. No retail house-to-house deliveries are made.

Because of the many exclusive store delivery outlets, with the stores relatively far apart, trucks with separate cabs and bodies were selected rather than the combination cab and body type with a low aisle and stand-up driver position, such as would be suitable for house-to-house deliveries. The separate body is also easier to protect against infiltration of engine odors and exhaust fumes that would contaminate the bread and cake carried.

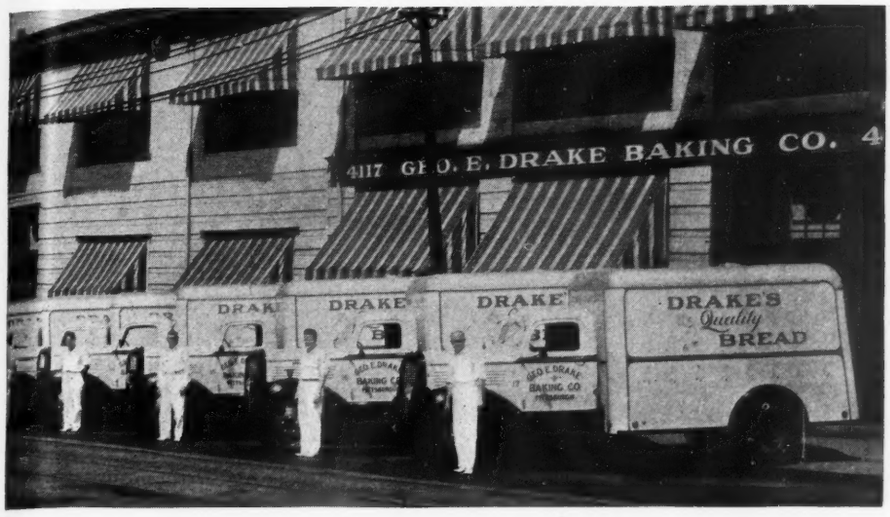
But even with a separate body, great care must be taken in the design and construction to make the body tight and keep it tight under operating conditions. In the Drake body, such precautions included a tongue-and-groove oak floor covered with galvanized iron, gaskets on the side and rear doors, tight inside body lining and the extension of the engine exhaust pipe to the extreme rear end of the body. The latter minimizes the possibility of pockets of exhaust gas forming under the body floor and seeping into the interior.

Before outlining the streamlined outside appearance of the body, its color combination and the means whereby its maximum advertising value has been obtained, the body may be described briefly as follows: It carries 1,800 loaves of bread and 200 cakes; has two doors, one at the rear and one on the right or curb side, near the front end; and has two interior shelves extending from side to side and from front to rear of the body, except for a driver's aisle in line with the side door. These details and the dimensions of the body are given in the accompanying drawing.

In outward appearance, the body design is modern and what is termed "streamlined," with rounded corners, rounded roof edges, aluminum-painted canvas roof covering, a graceful, sloping rear end and a bottom body line extending down to a level with



Three-quarter rear view of the Drake bakery body. It is painted in ivory with royal blue trim and featured by the marching row of hand-painted drakes, each with its up-turned beak and jauntily-placed baker's hat. Note also the truck's modern rounded corners and the beaver-tail rear end.



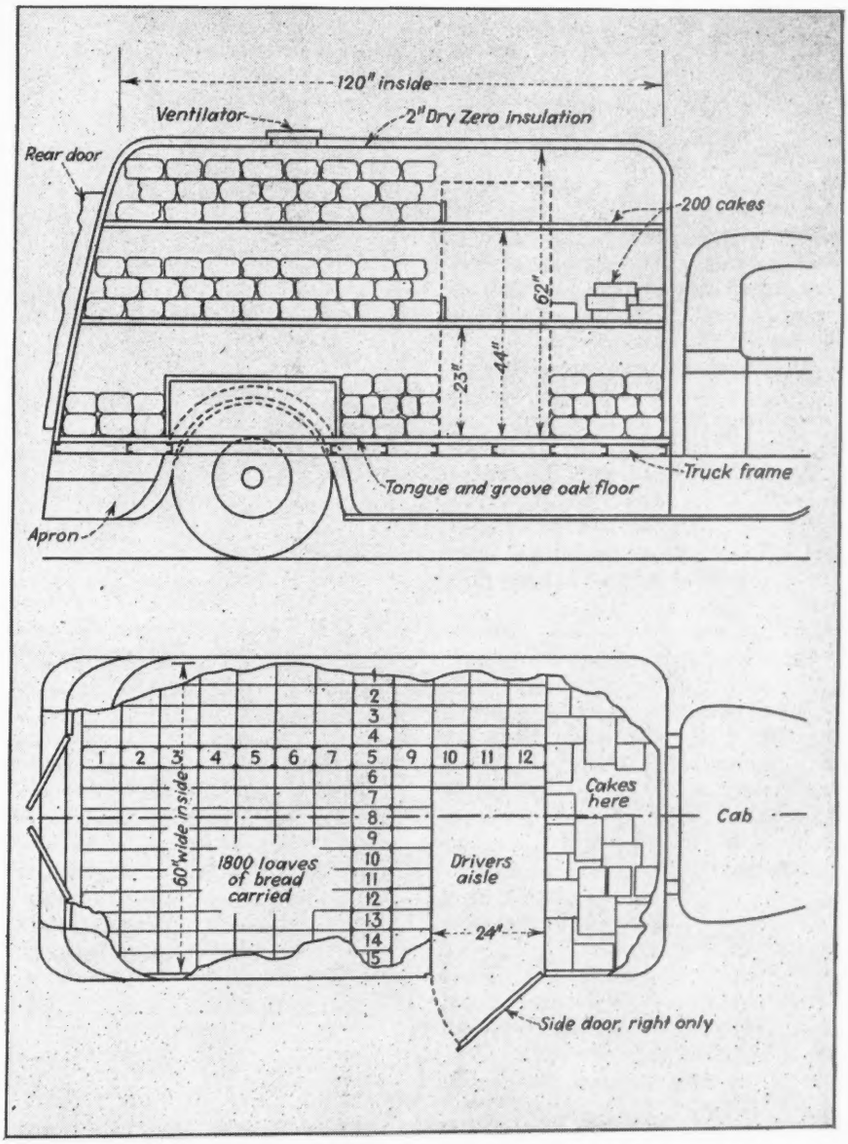
Part of the fleet of 23 Dodge delivery trucks operated by the George E. Drake Baking Co., Pittsburgh, Pa. The drivers are shown in their summer uniforms of white duck pants and white shirts. So that these uniforms are always clean and neat, four pairs of pants and six shirts are issued to each man. Winter uniforms made of whipcord in a French blue color are also worn. These consist of two pairs of trousers, a zipper blouse carrying the company insignia of a drake, and a six-point military cap. The men and the company share in the cost of each uniform and its cleaning and laundering.

the cab runningboard. The body sides are made up of two panels with a heavy horizontal molding dividing them. This molding is painted in a color contrasting with that of the panels. A similar molding is provided on the cab sides at the same height from the ground. This gives the vehicle the appearance of being longer than it really is.

In keeping with the trend of concerns in the food industries to paint their vehicles in a light color to suggest cleanliness of the food carried, the Drake body is painted an ivory color with the molding in royal blue. The lettering consists of "Drake's Quality Bread" on the two upper side panels, "Drake's Bread" and "Frances Drake Cakes" on the rear panel and the full company name and address on each cab door.

While the above lettering in the contrasting royal blue color gives a pleasing combination of good advertising value, the outstanding feature of the display is two rows of eight jauntily stepping drakes, each with its nose held high and with a baker's hat upon its head. Each row goes marching along on the body side below the belt molding, with still another drake on the rounded rear body corner and a larger size drake of the same design on each upper side panel ahead of the lettering. These drakes are hand-painted and shaded. The drake is the company trade-mark insignia and thus associates the vehicle with the product which it carries.

To help build morale, instill the idea of sanitary appearance and cleanliness and meet the competition of other bakers, all the Drake driver-salesmen are uniformed both summer and winter. The drivers and the company share in the cost of the uniforms and their cleaning and laundering.



Side and plan cutaway views of the George E. Drake Baking Co. body which carries 1,800 loaves of bread and 200 cakes in the manner shown. Access to the body is through one side and one rear door. Used in Pittsburgh, Pa., it was built by Doerr Brothers, Inc., of the same city. Note the 2-in. Dry-Zero roof insulation and the adjustable roof ventilator.

What QUALITY CONTROL *Means*

Things progressive food manufacturers must do and are doing to produce products consumers can and will depend upon.

By T. H. BUTTERWORTH
Consulting Dairy Technologist, San Antonio, Tex.

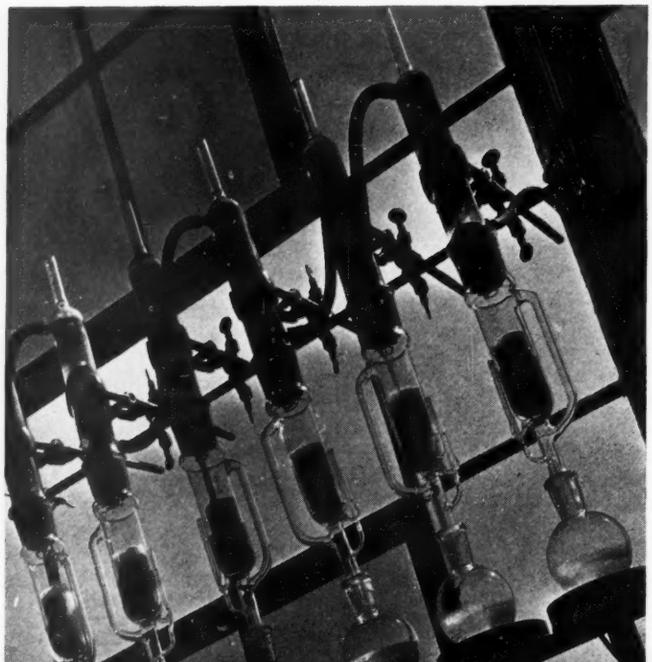


Photo by Sohnall

From coconut cake to strawberry jam, coffee and Brazil nuts, the whole gamut of foods "goes under the microscope" at General Foods new Central Research Laboratories at Hoboken, N. J. Here concentrated coconut oils are being boiled in laboratory retorts.

QUALITY CONTROL in the food industries differs in many respects from that in other fields. An automobile manufacturer may have physical and chemical tests made on all his raw materials, hire first class engineers and mechanics and be assured that if specifications are followed he can produce a first class car. The food manufacturer, on the other hand, is dealing with unstable biological substances and, while food science has progressed to an astonishing degree during the last fifteen years, no food manufacturer is ever entirely certain how his product is going to turn out. The canner may use choice fruits, the latest machinery and the most modern methods and still come a cropper with a batch due to bacterial action or some delicate unbalance of the ingredients. What canned as excellent cherries today may not do so tomorrow. Last year's method of making cream cheese may not work this spring if the composition of the milk is altered by an early season and pasturage.

It takes constant vigilance to insure quality food products. And because he has felt that quality is essential to the life of his business, the food manufacturer has developed a brand new branch of science—the science of quality control.

This science is young, but already it is requiring elaborately equipped laboratories staffed with trained specialists. Formerly a room in a manufacturing plant, politely termed "the lab", ruled over by a chemist known as "Doc", was sufficient to make crude examinations of bulk raw materials and a few routine analytical tests as a guide to the manufacturing process. Now, frequently an entire floor is given over to a laboratory directed by a college graduate with his staff of helpers. Where formerly abnormal conditions reported by "the lab" were more or less ignored, it being thought the error was with the test rather than the material tested, the laboratory now controls production in many plants. Manufacturing processes now go forward only when approved by the laboratory and only so long as the product made meets with the laboratory's established standards. One large concern has established an entire division of its company to act as a quality control unit. The "Sealtest" stamp of approval from this control laboratory appears on all its products. It is becoming as widely recognized as a symbol of excellence as the Good Housekeeping Institute's star or the American Medical Association's mark of approved foods.

This science is so new that usually the worker has first to find a quality both he and the management believe is worthy of controlling. Next he has to develop a test and finally establish his own set of standards. There are no textbooks or precedents upon the subject. It is a new, wide field which piques the imagination of the workers.

The quality control man must be a good chemist, a good physicist and a good biologist, for the tests he will make will partake of all these basic sciences. He must be a bit of an inventor, too, as well as having keen organoleptic reactions, i.e., he must have a good nose and a good taster.

Let us take half a pound of proc-

essed American cheese. The old fashioned food chemist will take it and tell you how much fat, moisture, casein, sugar and emulsifying salts are present; whether or not it contains preservatives or is otherwise adulterated. The physicist will weigh the package, tell you whether it is the proper shape and size. The biologist will tell you how many—and, perhaps, if he is a clever biologist, *what kinds* of—micro-organisms are present. What else can you know of this half a pound of cheese? It is full measure, contains the proper ingredients in correct proportion, is free from harmful organisms. It must be excellent cheese. But the quality control man isn't satisfied. He will do all that and then go on from there. He has a lot of questions to ask that cheese before he will put his stamp of approval upon it—before he acknowledges it as a quality product.

He wants to know if it is of proper color, has the proper delicate flavor and odor. How it slices. How it spreads. How it melts. If it will make a good rarebit. If it mixes well with macaroni and cream sauces. What its texture and body may be. How it reacts to temperature changes. He is interested in the design of the wrapper and the ease with which the housewife may open the package. He is particularly interested in knowing if this cheese is similar in all respects to other packages of the same brand. For uniformity is the keynote of quality control.

It has been said that the master salesman once boasted that he could sell garbage at a profit if it was of uniform composition. That is a queer remark in an article on quality, but it is inserted to emphasize the importance of uniformity of product in establishing a reputation for quality. What the manufacturer calls "uniformity" the housewife thinks of as "dependability" and, strange as it may seem, she has been known to prefer low-grade products of *dependable* composition to higher grade products lacking that essential reliability or uniformity.

So the quality control man is interested in comparing this cheese with the records of former batches, and finally, he is interested in what he calls "keeping quality" or the "life" of the cheese and what over-heating or freezing will do to it. These are important points today when products made at one place are shipped thousands of miles through varying climates before they reach the distributor, let alone the consumer. Products must have "life".

In an effort to answer these questions, the quality control technician in the food industry has developed many interesting and ingenious tests. The data from these, compiled from month to month and year to year, are insuring the purchaser of a quality controlled food product with that uniform excellence in all respects that she demands.

What they do to a loaf of bread in a large eastern food company to test its quality is revealing of the pains being taken to assure and insure quality products to customers. They measure its volume in a peculiar hourglass apparatus by the displacement of tiny seeds. They record its weight to the gram, note the color of the crust by comparison with a color chart, observe texture and body, note the arrangement of gas holes as compared to a standard loaf and test the slicing qualities. They observe general color of the bread, odor, taste and toasting qualities. And so proficient have workers in this laboratory become that they easily detect slight foreign odors or tastes arising from poor-grade ingredients or perhaps merely the use of a different brand of yeast. Only when a loaf meets the requirements of the established standards do they call it, and those similar to it, quality bread.

You will note that many of the above tests depend upon the use of the senses of taste and smell, are organoleptic tests. In such a case, the first thing to do is to establish a set of standards to go by, since odor and taste cannot generally be measured mechanically. These standards are the result of the consensus of opinion of a group of experts or the results of a consumer preference test. Next, technicians must be trained to recognize varying degrees of perfection in any one quality. The degree of accuracy obtained by some persons through practice in the use of these specialized senses of taste and smell is surprising.

Returning to our cheese, we test how it slices by the simple expedient of slicing it—slicing it on a mechanical meat slicer that can be adjusted as to thickness of slice. If we set the same thickness each time, we can soon tell which cheese gives us those smooth, unbroken slices so desirable for sandwiches and canapes. Toughness can be measured by a spear-like apparatus. A weighted spear or plunger is dropped from a constant height, and the depth to which the point and shaft penetrate the surface of the cheese at a standard temperature is a measure of the toughness. This depth is read from a scale on the shaft of the spear.

These tests are all very elementary, you say. True. And it is not always the technician's job to invent new tests of elaborate nature or complicated equipment. He is for the most part concerned with establishing standard conditions for the performance of such tests as are used—standard conditions which allow for the maximum information being obtained in the simplest manner. And this establishment of standard conditions opens the field of comparison closed to the old fashioned methods of day-by-day observation without records. Results of today's standard tests on the slicing of American processed cheese can be compared with those standard tests of last April or a year ago last June, and helpful conclusions drawn therefrom. They are the means by which the manufacturer at last is able to give the uniform product the consumer desires. Standard conditions for determining moisture may not be very hard to achieve, but how about standardizing a test for the spreading quality of a sandwich spread? It is such things that tax the imagination of the quality control worker. He must, in many instances, clothe the simple household test or merely the

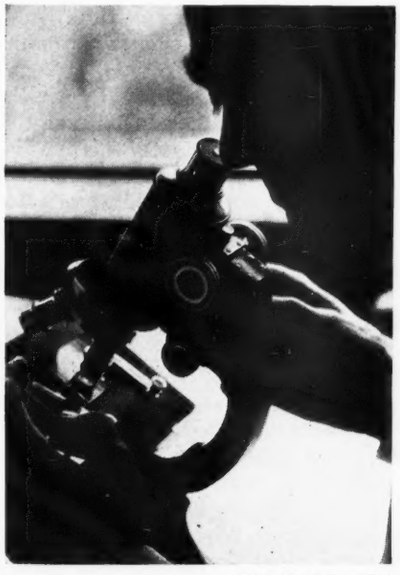


Photo by McGraw-Hill

Quality, or lack of it, may often be detected through the microscope.

► ***Nothing is more important to continued success in the highly competitive food business than progressive quality control. So the ideas in this article are of practical value to***

All food manufacturers

observation of a color or odor with the scientific cloak of accuracy. He has had to introduce the science of measurement into the realm of rule-of-thumb.

Speaking of toughness brings to mind the testing of sponge cake. One method is to cut a chunk of cake from the loaf and trim it down with a sharp, toothed knife to a definite shape and size somewhat resembling a square hour-glass. This piece is firmly secured at one end to a support and a small pan hung off the bottom by means of a wide-jawed clamp and a chain. Now if mercury is run into the pan slowly, the cake will stretch and eventually break at the "waist". The weight of mercury necessary to complete this "break" is a measure of the cake's toughness.

Citrus fruit growers are interested in the ripeness of the fruit for shipment. Since ripeness is not necessarily correlated with color, as people generally think, ripeness had always been somewhat of a guessing game with shippers. Now quality control men have developed an electric "taster". When properly plugged in, this registers the degree of ripeness of the fruit.

Cream is among those foods having special quality tests. It must have a body or degree of thickness to please the discriminating user. One hears the opinion that the more fat there is in a cream, the heavier it will be in body. But this is not so. Body is more influenced by the treatment a cream receives in the creamery than by even moderately large changes in fat content. Of course, when he realized this, the creamery man was interested in measuring body. Quality control men invented the instrument and developed standards. They measured the time consumed for a given amount of cream at a given temperature to flow through a standard-size pipe. The heavier the cream body, the slower the flow and the more time consumed. Today, creamery men speak of so many "seconds" cream body.

Usability, to coin a word, is important in quality control. A certain firm makes milk powder, advertising it as especially fine for making baker's bread. They are not satisfied with drying a good grade of milk, or making periodic tests on it and letting it go at that. They actually make a loaf of bread from every single batch of milk that is dried. And, until they have demonstrated to their entire satisfaction that the powdered milk will do what they claim, they will not release it to the sales division for distribution. That is one of the things that gives quality food products that plus value.

Color is important. Who would buy green butter? Or more to the point, who would buy butter that was deep yellow today, light orange tomorrow and pale lemon next week? Lack of uniformity. One wants natural colors, or at least the color one is accustomed to, whether it be in canned peas, Swiss cheese, jellies, sponge cake or Florida oranges. The old method of comparing one lot with another from day to day too frequently permitted cumulative error, and the producer suddenly discovered that, in losing or gaining an imperceptible amount in color each day, he had at length wandered far from the original standard. The next step in control was the introduction of printed or painted color charts as standards. Now color can be registered with extreme accuracy in absolute degrees by an apparatus employing the "electric eye", or photocell.

This eye, the latest of laboratory tools, is being used in a number of tests and measurements in quality control, notably in sorting, counting and separating sizes. The x-ray principle spots the accidental presence of nuts or screws in canned goods; fluoroscopic methods detect other defects. Fluorescence in the presence of ultra violet light is just beginning to be used in the control of food products. And finally there is the long list of biological tests, principally bacteriological and microscopical, that are the tools of quality control technicians.

In the realm of bacteriology, there seems no end to the number of tests, both old and new, that are applicable to food control. Brand new media and technics are developed overnight. The question of bacterial spoilage of foods is a story all its own, fascinating in the extreme.

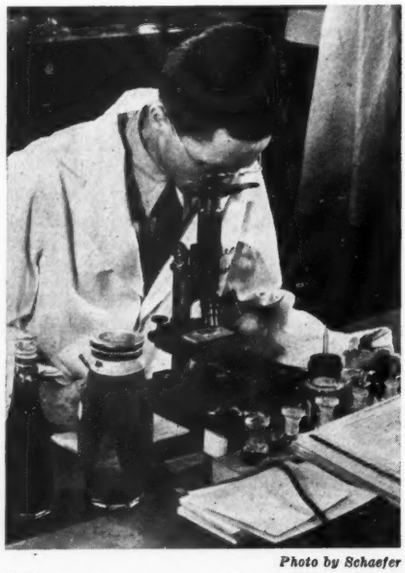


Photo by Schaefer

Laboratory tests are mainstays of quality control. This is a view of control operations at Crosse & Blackwell Co., Baltimore.

Microscopy is only beginning to be of the use it eventually can be in the identification of foreign matter in foods, in the detection of those substances that defy the crudities of common chemistry. For example, by and large the chemistry texts don't give tests for the detection of hair. The microscope will detect hair though, even very small ones. And more than that, it will tell the experienced worker what kind of hair is present—will tell him by the striations observed in the microscopic structure whether it is hair from a rat, a human or other source.

Returning again to processed cheese, it was stated that the control laboratory was interested in the "life" of the cheese—how long it could be expected to last. That is a question put to all foods, and answered in general in one of two ways. Storage tests are made of the product, where it is subjected to the conditions which it is most apt to encounter out in the trade. This is a time consuming method, but frequently is necessary. Or else the product is subjected to drastic conditions in an effort to simulate in a few hours what may be expected to happen to it in the trade in a matter of weeks. For example, canned food sometimes spoils. Before it is shipped from the cannery, it is best to know if any particular batch is likely to spoil. To determine this, sample cans representing all the batches of manufacture can be put into incubators or heated chambers to hasten the growth of the spoilage bacteria. If the cans survive this test, they are reasonably safe to put on the market.

All this costs money. Why are the manufacturers willing to go to all this expense? Can the profits from increased sales balance the expense? Not completely. The industry is too highly competitive, but it considers quality control a form of insurance. As one executive put it: "The financial loss due to one lawsuit, to say nothing of the loss of good will which accompanies such publicity, would far exceed any yearly costs we may incur in our little quality control setup. Besides, we can not produce the high type of product the public demands without it. And finally, I find that, by this intense examination of our products, we learn a little something all the time that helps us to improve and correct our ways as we go along. Yes, in the long run it pays."

DEHYDRATION EQUIPMENT
As Applied to Food Processing

Drying operations, as distinct from dewatering accomplished by means of evaporators, filters and centrifugals, remove moisture in varying amounts from food materials, and employ a great variety of machines and methods

By FRANCIS ROSSEAU
Specialist in
Food Dehydration and Drying
Lyme, Conn.

A UNIT OPERATION OF FOOD ENGINEERING

Dehydration

▶ Moisture is removed from food materials for a variety of reasons. The moisture content of food ingredients is lowered as a step in processing. Part of the moisture is removed from a product in order to get a dryer finished product. And some products are dehydrated, to remove as much moisture as possible in order to reduce weight and improve keeping quality. These drying operations are widely used in the food industries and the engineering and control of the equipment in which drying is carried out, for economy and efficiency, is one of the problems most frequently met by the food engineer.

This is No. 14 of a series on the unit operations of food engineering

DRYING, as applied in the food industries, refers to the evaporation of water from food products to convert them into dry or partially dry form. The process is costly, since this removal of free moisture (as distinguished from moisture of crystallization) is accomplished by the application of heat. Every effort is made, therefore, to first reduce the moisture content by mechanical means. For this purpose a wide variety of commercial dewatering equipment is available. A practical discussion of this dewatering equipment requires separate treatment, and will not be included in this article.

Some dry products must be obtained from dilute solutions. In such cases the per cent solids must be increased before dryers can be used economically. The maximum degree of concentration is determined in each case by the material and the method of concentrating and drying. As the capacity of the drying unit increases very rapidly with the concentration of the solids, the use of vacuum evaporators is becoming more and more popular.

The rapidity of this increase in dryer capacity is not always fully appreciated. For instance in the case of a material having 90 per cent moisture (wet basis), concentration to 50 per cent moisture (wet basis) would reduce the amount of water to be evaporated per pound of dry product from nine pounds to one.

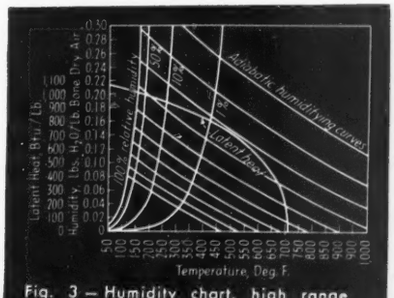


Fig. 3 — Humidity chart, high range, from which can be theoretically determined the cooling effect produced by evaporation

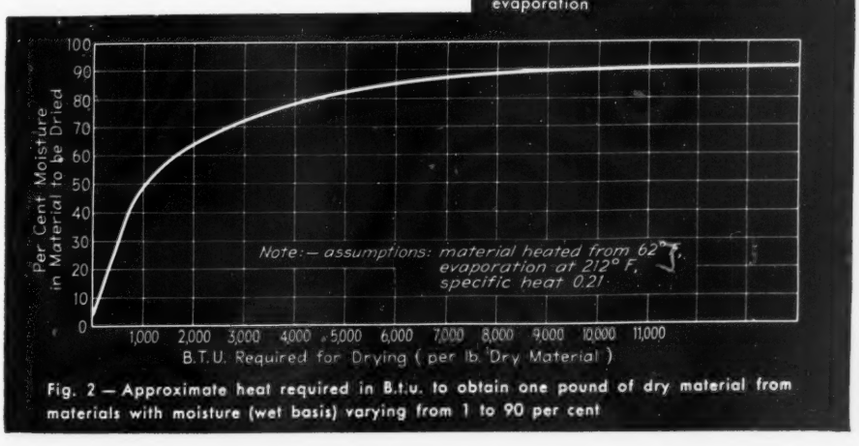

Per Cent Moisture in Material to be Dried
Note:— assumptions: material heated from 62° F. evaporation at 212° F. specific heat 0.21
B.T.U. Required for Drying (per lb. Dry Material)

Fig. 2 — Approximate heat required in B.t.u. to obtain one pound of dry material from materials with moisture (wet basis) varying from 1 to 90 per cent

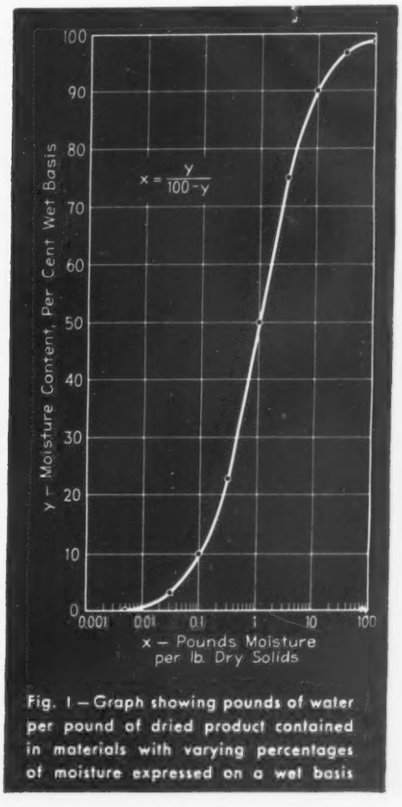


Fig. 1 — Graph showing pounds of water per pound of dried product contained in materials with varying percentages of moisture expressed on a wet basis

The chart reproduced in Fig. 1 shows at a glance the pounds of moisture which must be evaporated for any product whose per cent moisture content on wet basis is known.

The approximate heat required for obtaining one pound of dry material with percentage of moisture (wet basis) varying from 1 to 90 is shown by the graph in Fig. 2.

When the quantity of material to be dried runs into considerable tonnage, it becomes increasingly important to carry out the operation as efficiently as possible. In order to do this, the product must be handled automatically and the drying conducted at the highest possible rate without injury to the material. The rate of evaporation is accelerated by:

1. Handling the material so as to expose the maximum amount of surface to the drying medium.
2. Using the highest possible temperature of drying medium that will not injure the product.
3. Agitating the material with respect to its surrounding atmosphere, or vice versa.
4. Keeping the relative humidity of the drying medium at a determined range below that of the drying product.

The limiting factors in any drying operation, which are inherent in the product, are: the rate of diffusion of the moisture through the material, and the maximum temperature to which the material can be heated without causing deterioration. Increasing the exposed area affects both factors just named. The rate of diffusion is increased by reducing the distance through which moisture must travel to the surface of the product. This increased diffusion makes greater evaporation possible which in turn keeps the material cooler.

The extent of this cooling effect produced by evaporation is seldom realized by the layman. For instance, with a material having a very high moisture diffusion rate, it would be feasible to use drying air temperature as high as 1,000 deg. F. or even higher, and yet not raise the temperature of the material itself above 160 to 180 deg. F., or the wet bulb temperature of the air. This is assuming ideal evaporating conditions, seldom achieved in practice. When handling such high temperature drying gases, absolute control of the operation is required because of danger of combustion and explosion of some products.

This cooling effect can be determined theoretically from the humidity chart reproduced in Fig. 3. Three percentage saturation curves are plotted at left with humidity as ordinate and temperature as abscissa. For any given wet bulb temperature and per cent relative humidity, the humidity in pounds of water vapor per pound of bone dry air can be read at the right. For example, in the case of air at 100 deg. F. wet bulb temperature and 50 per cent saturation, we would use the ordinate at the intersection of the 50 per cent saturation curve and 100 deg. F., obtaining a reading of 0.02 lb. approximately. The adiabatic cool-

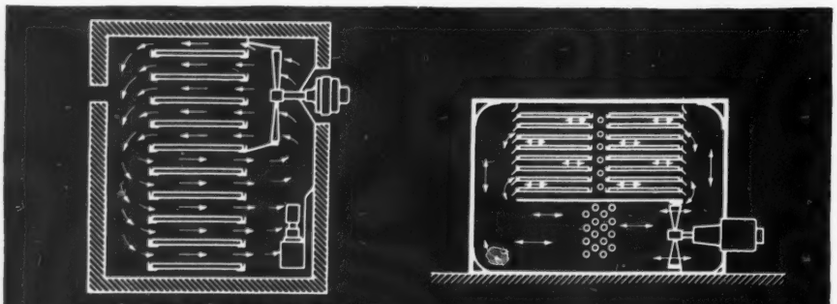


Fig. 4 — Compartment dryer for laboratory use, electrically heated and suitable for drying material on trays, sticks or hooks

Fig. 5 — Compartment dryer of tray type for drying relatively small quantities

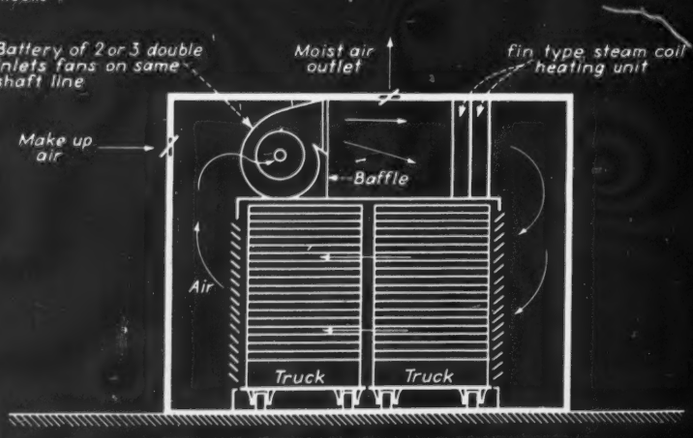


Fig. 7 — Compartment dryer of truck type with centrifugal fan air circulation. The use of centrifugal fans is recommended where positive air circulation is desired through heavily loaded shelves, as the result is generally quicker drying and better heat distribution

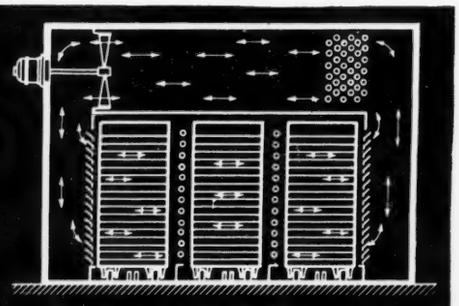


Fig. 6 — Compartment dryer of truck type for drying on trays carried on trucks. Can be built for large or small quantity, batch or continuous operation

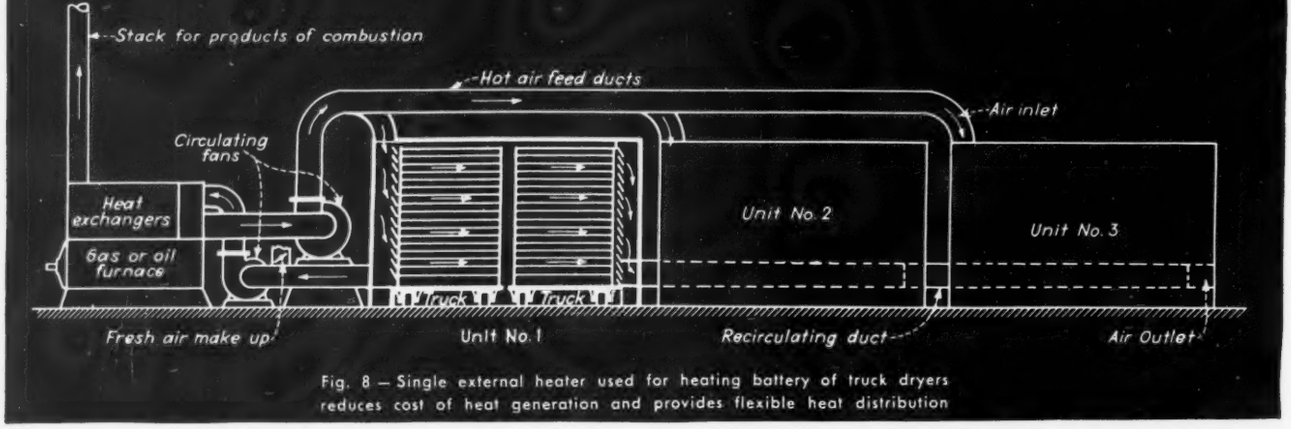


Fig. 8 — Single external heater used for heating battery of truck dryers reduces cost of heat generation and provides flexible heat distribution

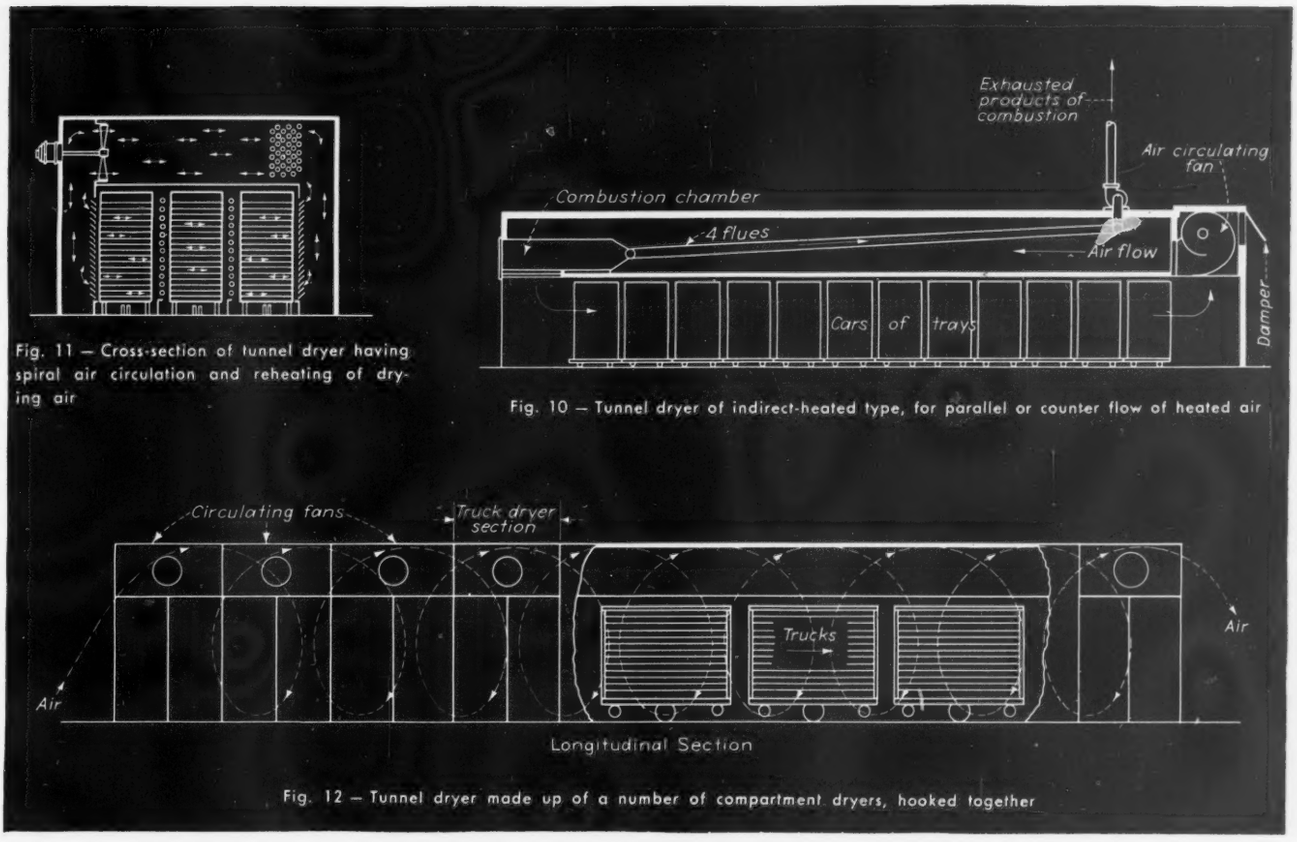


Fig. 11 — Cross-section of tunnel dryer having spiral air circulation and reheating of drying air

Fig. 10 — Tunnel dryer of indirect-heated type, for parallel or counter flow of heated air

Fig. 12 — Tunnel dryer made up of a number of compartment dryers, hooked together

ing lines represent the drying process of evaporating a liquid by causing it to absorb heat from a gaseous fluid, heat being neither added nor removed by any external sources. These lines start at the right with the initial humidity and temperature of the air and end at the 100 per cent saturation curve at the left when the air has been cooled to wet bulb temperature. In our discussion, this wet bulb temperature represents the temperature of the moist product being dried.

So many factors affect the drying characteristics of each product that it is not practicable to foretell with any degree of accuracy what is the best method of drying a new material without first conducting preliminary tests on the equipment offering the best possibilities. An attempt will be made to classify the application of the various general types of dryers. This classification should be considered purely as a general guide. Manufacturers of drying equipment maintain research staffs who are in a position to carry out the necessary tests upon which to base accurate recommendations for the application of their equipment. In many cases, these tests and recommendations have been instrumental in saving millions of dollars every year.

It is hoped that a single presentation of all the principal commercial methods of drying food products will suggest the possibilities of new methods of approach in cases where the present methods are not entirely satisfactory.

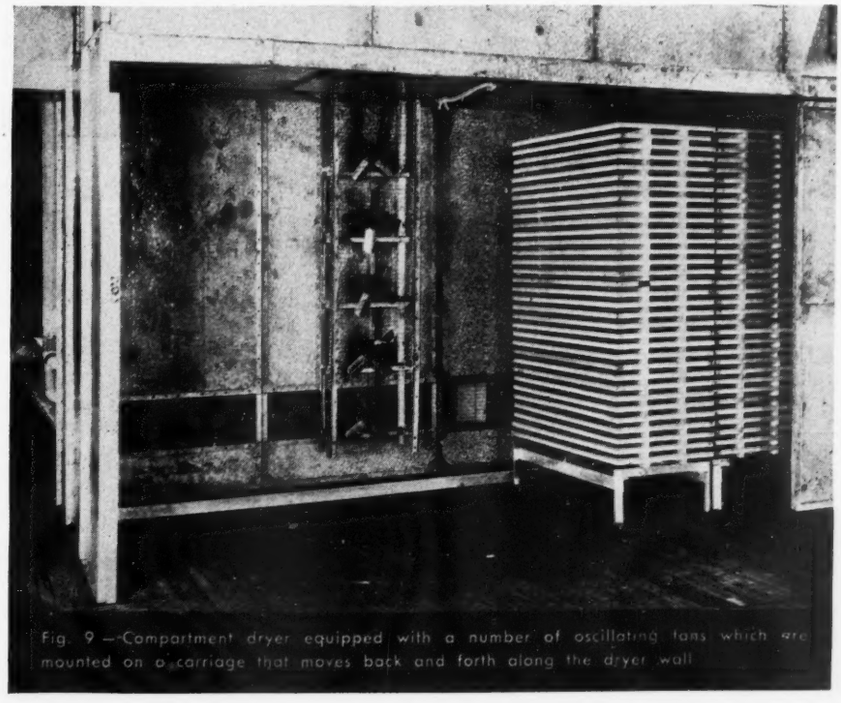


Fig. 9 — Compartment dryer equipped with a number of oscillating fans which are mounted on a carriage that moves back and forth along the dryer wall

Some Food Products Requiring Drying in Their Preparation

Apple pomace
Apples, dehydrated
Apricots
Baby food preparations
Baking Powder
Banana powder or flakes
Beans
Beef extracts
Beets
Beverage powders
Bouillon cubes
Bread crumbs
Breakfast foods
Buttermilk powder
Candy
Carrots
Casein
Garlic
Gelatine
Glace fruits
Gluten
Grape pomace
Grasses
Gums
Hops, spent
Lactose
Macaroni
Malt extract
Milk powder
Molasses
Noodles
Nuts
Onion powder and flakes
Peas
Pectin

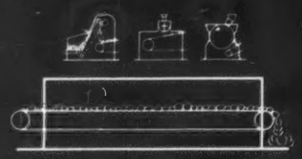


Fig. 13 — Conveyor dryer equipped with a wire mesh belt to move material through the drying compartment, in which one or more parallel belts may be used

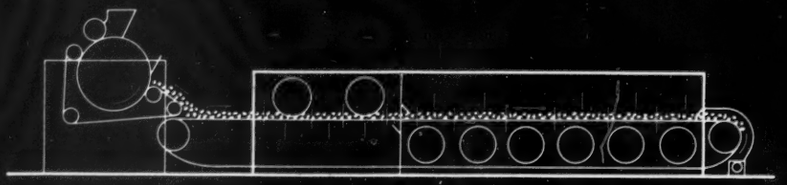


Fig. 14 — Conveyor dryer equipped with a pre-former which shapes the material into sticks before drying, applied to drying of material from filters. Note interior compartments and fan locations, which give a distribution suitable for rapid drying operations

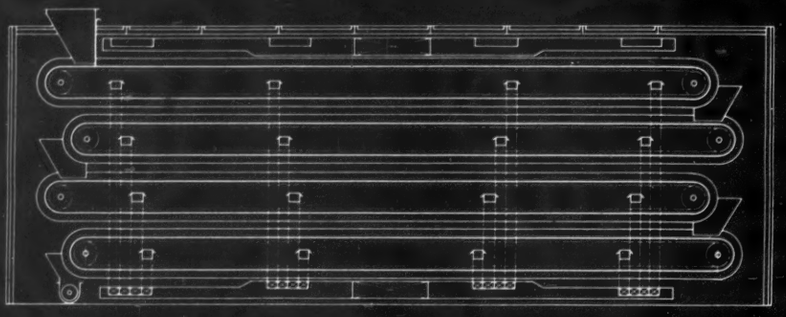


Fig. 15 — Conveyor dryer arranged for multiple passes of belt through dryer. Discharge is to screw conveyor at bottom, directly under loading hopper

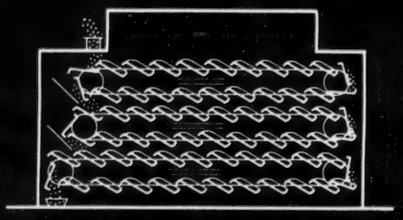


Fig. 16 — Conveyor dryer of the reversing pan type, a multiple pass dryer in which reversing pans take the place of the belt shown in Fig. 15

Cereals
Cheese
Chewing gum
Chicle
Citrus products
Cocoa, beans and nibs
Coconuts (shreds)
Coffee extract powder
Copra
Corn, dehydrated and flour
Crab scrap
Dessert powders
Eggs
Fish powders
Food dyes
Fruit powders, flavoring
Fruits, dried
Peppers
Potato powder and flakes
Prunes
Rice
Salt
Seeds
Shrimp waste
Soup powders
Soybeans
Spaghetti
Starch
Sugar
Tomatoes
Tomato catsup flakes
Tomato soup flakes
Vinegar gains
Wheat
Yeast

General Classification of Dryers

Dryers can be divided into two general classifications:

I. Batch Dryers

(a) Sun dryers
(b) Loft dryers
(c) Compartment dryers, shelf, tray, truck
(d) Vacuum shelf dryers

II. Continuous Dryers

(a) Tunnel (these can also be batch dryers)
(b) Conveyor dryers
(c) Rotary dryers, atmospheric, vacuum
(d) Drum dryers, atmospheric, vacuum
(e) Flash dryers, kiln-mill type
(f) Spray dryers

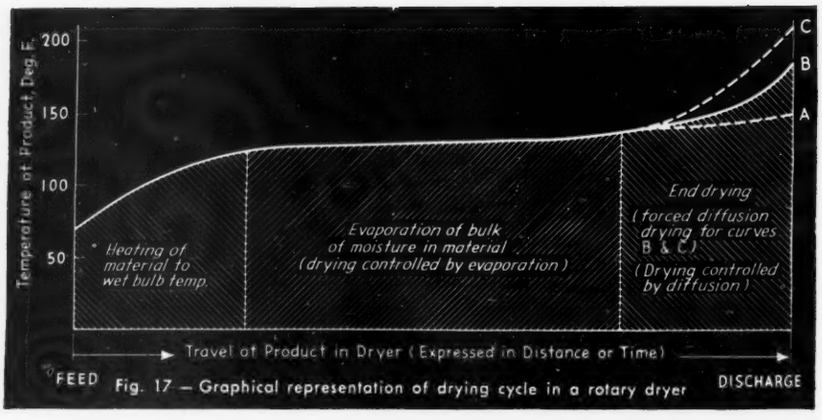


Fig. 17 — Graphical representation of drying cycle in a rotary dryer

Sun Drying—The utilization of sun heat has not been entirely supplanted by artificial methods. This is particularly so in hot countries where cut fruits—peaches, apricots, and pears—are dried during the hot dry summer months.

When considering sun drying of fruits, it should be borne in mind that the labor of preparing the fruit for this method is by far the largest item. This cost is considerably less in artificially dried products; and the additional cost of fuel is not over 24 per cent and in some cases as low as 9½ per cent of the total cost of dehydration per fresh ton of fruits. As a consequence, sun drying, although requiring a much smaller initial investment, is not necessarily cheapest. The increased yield and quality of some artificially dried products more than offset the equipment expense.

Loft Dryers—This type is the simplest dryer using artificial heat. It consists of a loft or large room, heated with steam coils, hot air, or products of combustion. This mode of drying is rarely used, because of its inefficiency, varied quality of finished product and waste of space.

Compartment Dryers — This type embodies all the refinements of the large continuous dryers. The source of heat may be steam, electricity, or the products of combustion, of a gas, coke, coal, or oil furnace, suitably mixed with fresh air. Modern compartment dryers are built of air tight hollow sheet metal walls filled with a non-packing insulating material. Provision is made for free expansion of the metal sheets. Forced recirculation of air is commonly used. The control of the heat is positive and accurate and its distribution is very uniform. In the more expensive dryers, the operation is entirely automatically controlled.

In order to increase the rate and uniformity of drying, the material is loaded so as to offer the greatest possible surface. It is spread in thin layers on shelves or trays. In the case of tray dryers, each shelf slides out of the dryer on individual guides. In the shelf dryer, the shelves are fixed but spaced further apart. In the truck dryer, the shelves are mounted on trucks which are rolled in and out of the dryer.

The cost of such dryers, on a cubic foot capacity basis, is generally high because of the large proportionate wall area, the cost of air circulation, and the application of control systems to a restricted volume. Figs. 4, 5, 6, 7 and 8 illustrate types of compartment dryers.

Compartment Dryers (Movable Fan Type)—Another variation of the compartment dryer, is a design in which the material is loaded the conventional way, but with the difference that the circulating fans themselves are mounted on a carriage which travels back and forth along one side of the compartment. The circulation of the heated medium over the material is intermittent in cycles about a minute apart, with two seconds of violent circulation for each cycle. This principle was developed by Mr. Al. Belanger for the Allbright-Nell Co. The minute interval of non-agitation, a sort of incubation period, is intended to cause the moisture to travel to the surface of the product. This system should permit the use of a higher temperature of air at the fans, since the material exposed to the blast of heat is always protected by a greater amount of moisture at the surface. However, the rapidity of drying very likely is not increased, for the evaporating rate has been pretty definitely based on the differential of vapor pressure potential between the moisture in the material and in the surrounding drying medium. In dryers providing constant agitation, this differential is at

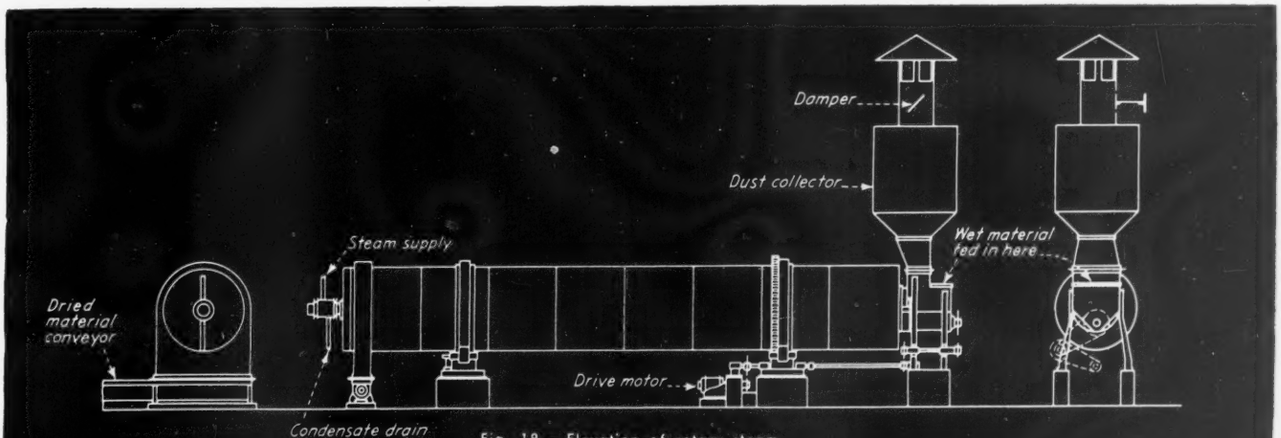


Fig. 18 — Elevation of rotary steam tube dryer, showing general layout

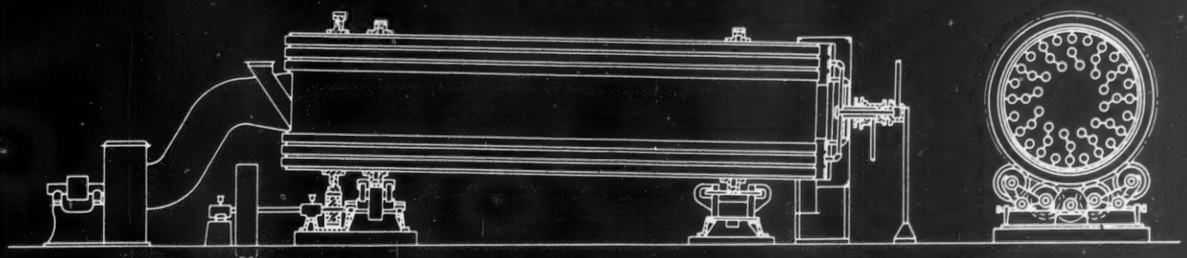


Fig. 19 — In this design of steam tube dryer, the steam drum is secured on the inside of the cylinder, rotating with the tubes, which increases the heating surfaces and reduces the fall of material being dried

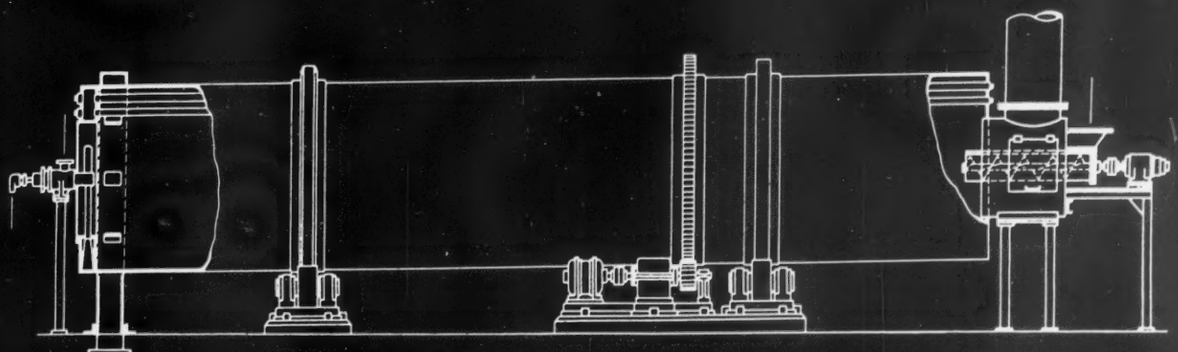


Fig. 20 — Another design of rotary steam tube dryer

a maximum all the time. It is very probable, on the other hand, that such a system would give very desirable results with certain types of products which must be dried without change in original shape, like noodles and macaroni. Fig. 9 illustrates this type.

Tunnel Dryers—Products which require long periods of time for drying are generally processed in tunnel dryers. This is particularly the case with raisins, apples, prunes and figs, which are harvested during the latter part of the summer when rains are frequent.

The tunnel dryer is essentially a truck dryer in which the trucks are placed in one continuous line and moved by some mechanical conveyor. Heating is generally restricted to convection obtained from steam heated air or products of combustion. The air may be circulated in the direction of travel of the trucks (parallel flow), in the opposite direction (counter flow), or in a combination of both. In this last case, the air is generally introduced in the center of the tunnel and circulated toward each end. Spiral circulation is also used. The drying medium then is forced almost at a right angle to the path of the trucks and gradually spirals its way to the end of the tunnel.

The humidity of the air or drying gases is controlled by recirculation. Ordinarily, the air is exhausted at approximately 130 deg. F. and 65 per cent relative humidity. The recirculated air enters the tunnel at approximately 165 deg. F. and 25 per cent relative humidity. Air velocities vary from 600 to 1,000 ft. per minute. A heat consumption of approximately 2,440 B.t.u. per lb. of water evaporated is common in fruit drying. Based on 500 lb. of water evaporated per hour and fuel oil of 142,000 B.t.u. per gal., a consumption of 8.6 gal. per hour would result. The fuel cost of dehydrating fresh fruits in tunnels is estimated at from $0.75 to $1.20 per fresh ton, depending on the product, cost of oil and method of processing. Overall thermal efficiencies of 40 to 50 per cent are obtained in practice.

Truck dryers may be run on batch or continuous operation. For batch operation, the time of loading the tunnel is generally small as compared to the drying time. For continuous operation, the material introduced into the tunnel on the first truck should be dried by the time the truck reaches the discharge end, or by the time the tunnel is completely loaded. The trucks then really act as segments of a continuous conveyor and can be moved by cogs on a continuous chain. A unit operating in this manner can be made very efficient and requires little supervision. The chief handicap of all tunnel drying lies in the labor necessary for loading and unloading the trays. However, even this can be handled semi-automatically in the case of some products.

The margin of profit in highly competitive food products is unfortunately too often very small. As a result, executives considering tunnel drying are sometimes discouraged by the initial cost of this type of equipment. The cost of steel prefabricated tunnel dryers is necessarily high compared with the expected output. In imperative cases where the capital available is very restricted, recourse can be had to the possibility of construction of the dryer by the user himself. This can be done at a greatly reduced cost; but only provided the proper design is utilized. Figs. 10, 11 and 12 illustrate the general features of tunnel dryers.

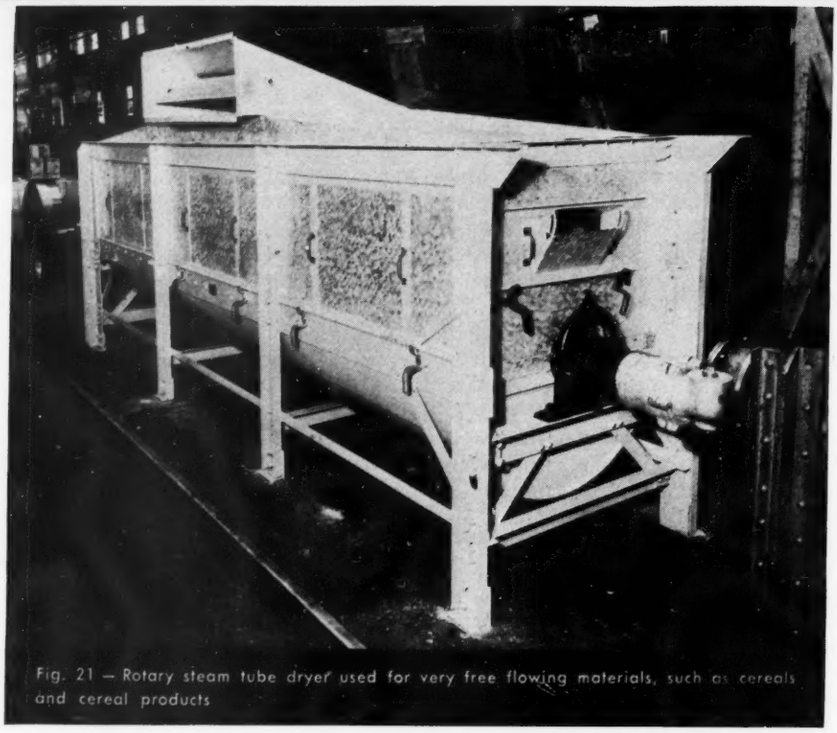


Fig. 21 — Rotary steam tube dryer used for very free flowing materials, such as cereals and cereal products

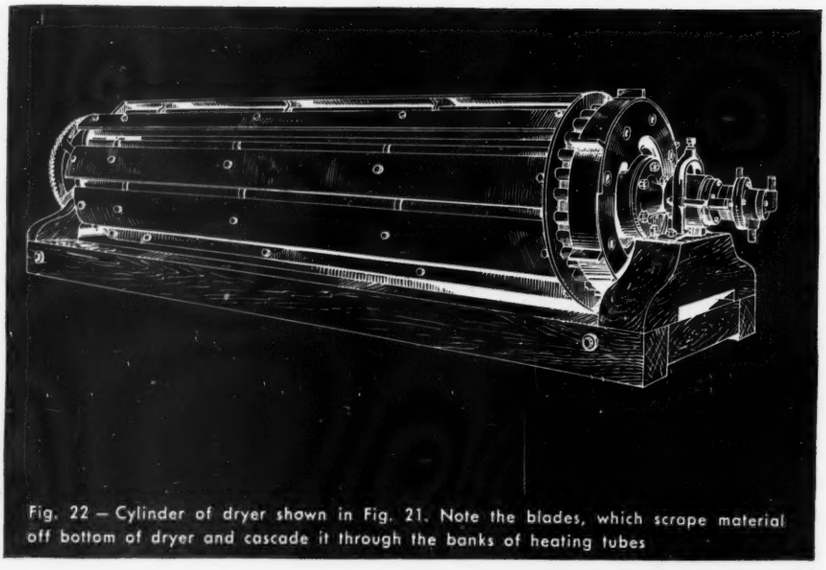


Fig. 22 — Cylinder of dryer shown in Fig. 21. Note the blades, which scrape material off bottom of dryer and cascade it through the banks of heating tubes

Conveyor or Apron Type Dryers—This type of dryer is very commonly used in the chemical process industries and has some definite applications to food drying when the drying time is shorter than for tunnel drying and the product cannot be agitated. It operates on the same principle as the tunnel dryer, with the exception that the material is loaded on single or multiple continuous belts, screens, or aprons which carry the product through the tunnel. The loading area is generally greatly reduced. The loading can be carried out automatically. The single conveyor type

is particularly suited for long fibered or bulky, rapid drying food products.

Figs. 13 and 14 illustrate this type. The drying time and capacity of the unit can be greatly increased by using multiple passes as shown by Figs. 15 and 16. However, the automatic reloading limits the application to material susceptible to that treatment.

Rotary Dryers—This type of dryer is one of the most common because of its great flexibility, high possible thermal efficiency and ease of operation. The material is fed at one end and is automatically transported through a cylindrical chamber revolving about a horizontal axis. The rate of discharge is regulated by varying the slope from the feed to the discharge end of the cylinder. The material fed into the cylinder is lifted to the top of the cylinder by flights or shelves and cascades down across the cylinder at each revolution. Fig. 17 is an attempt at a general graphical representation of the drying cycle in rotary dryers. The temperatures shown are purely arbitrary and used only to assist in giving a general idea of the scale. They would obviously vary for each product, apparatus and set of drying conditions.

It can be seen that the greatest danger occurs in the "end drying," when the diffusion of moisture through the product drops rapidly, causing the temperature of the material to rise. Material with greater diffusion drop might be represented by curve C, those with the least drop might follow line A, and the others would occupy intermediary places in between, like the solid line B.

The equation of heat transfer developed by Messrs. Walker, Lewis and McAdams in their book "Principle of Chemical Engineering" can be applied to the first two stages of the drying cycle, and to the third stage if sufficient data are available, as follows:

B.t.u. transferred per hour = $hA(\Delta t)$

Where h = the overall coefficient of heat transfer

A = the area of the heating surface in square feet. (It is suggested in the above reference that the term hA be treated as a single coefficient determined for each material and apparatus.)

Δt = the overall temperature difference in deg. F. between the points from and to which heat is flowing.

Rotary dryers classified on basis of flow of material and drying medium fall into the following categories: parallel current dryers, in which hot gases pass through the cylinder in the same direction as that of the material; counter current dryers, in which hot gases travel through the cylinder in opposite directions; reversed current or combination current dryers, in which parallel and counter currents are employed.

Parallel flow or current is of special advantage for materials which are not affected by exposure to high temperatures when wet and which are dried to a comparatively high residual moisture content. This system of circulation cannot be used on materials containing fines which would be carried off by hot gases, nor on materials having a tendency to case harden. The resulting evaporating effect is not as rapid for the entire drying cycle as it is with the other modes of circulation. To compensate for this, the length of the cylinder is generally made longer, thus increasing the drying time without reducing the capacity. From the standpoint of thermal efficiency, the parallel flow reduces the radiation losses. This is because of a more rapid reduction of gas temperatures caused by the hottest gases coming in contact with the wettest material.

The final removal of moisture from the material is more quickly accom-

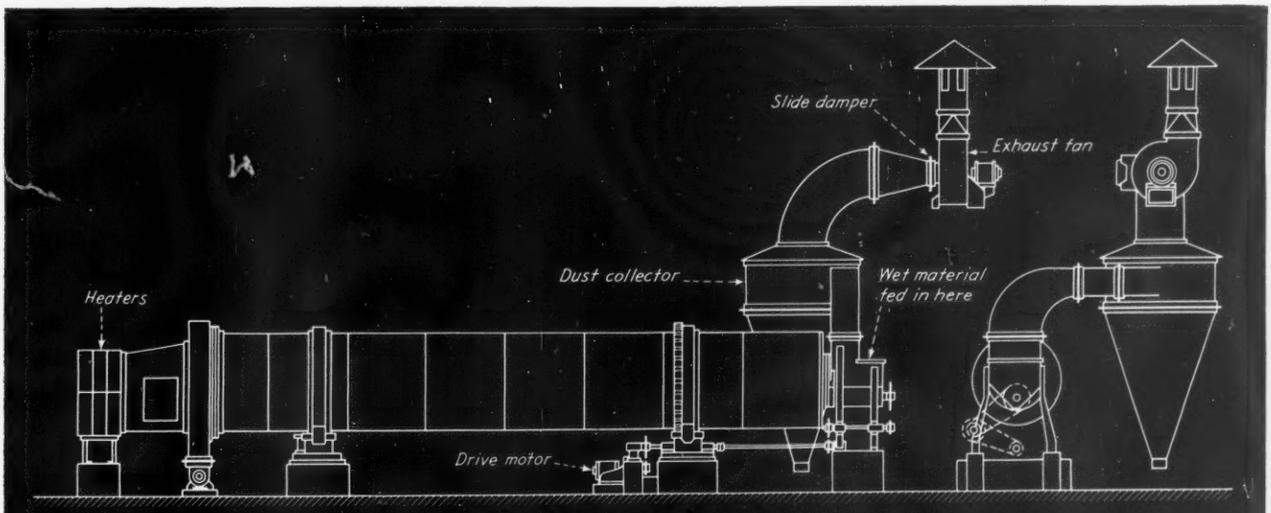


Fig. 23 — Indirect type of steam heated dryer. Note location of heating coils at left on air inlet end

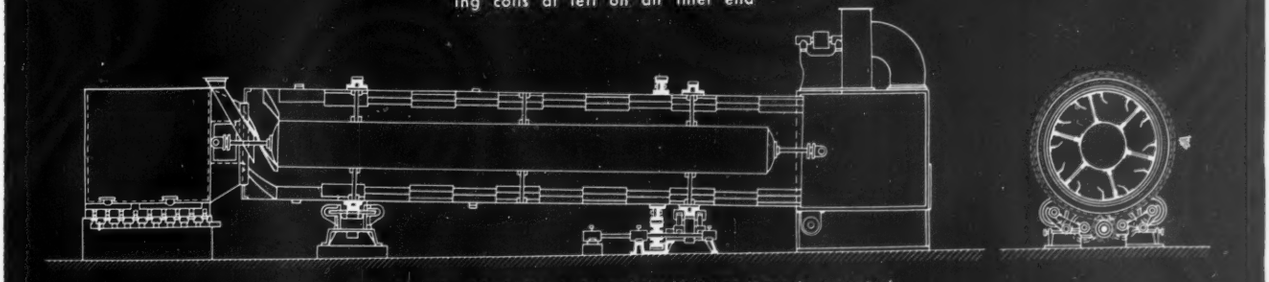


Fig. 24 — In this indirect steam heated dryer there is a central steam drum as well as heating coils at air entrance. This permits effective drying at relatively low temperatures by adding heat within the dryer shell

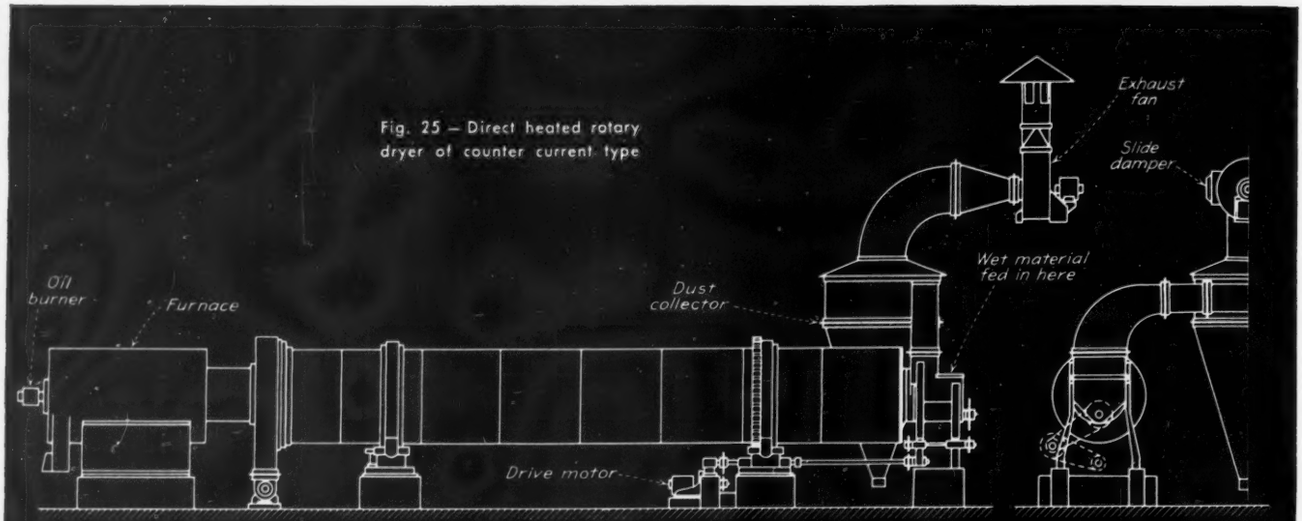


Fig. 25 — Direct heated rotary dryer of counter current type

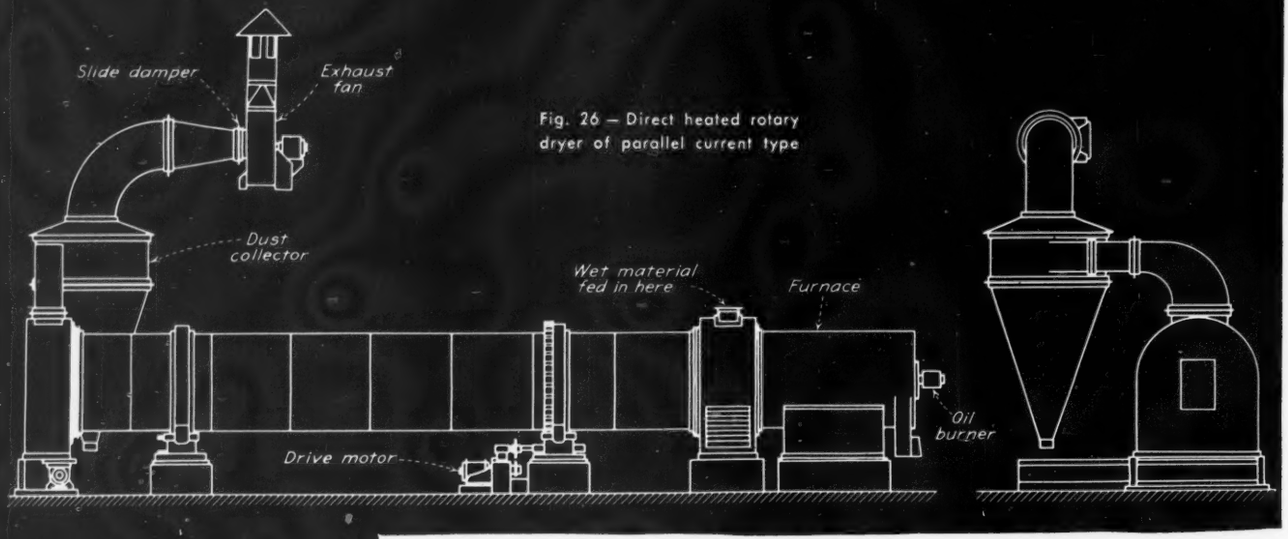


Fig. 26 — Direct heated rotary dryer of parallel current type

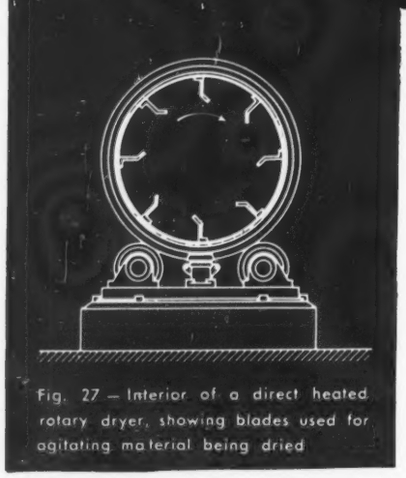


Fig. 27 — Interior of a direct heated rotary dryer, showing blades used for agitating material being dried

plished with counter current drying. The hot gases from the furnace meet the product as it is coming out of the dryer, so that the temperature gradient between gases and material is at a maximum. Since the "end drying" of most products is very slow, this type of circulation reduces the drying time. The advantages of counter current dryers are: quicker drying and greater capacity; elimination of case hardening, since the wet material is dried by dampened gases; and minimum residual moisture in finished product, resulting from greater temperature gradient in "end drying."

The following factors should be considered when selecting counter current rotary dryers:

1. The charge may be injured by heat, as it is not protected by maximum moisture when it meets the highest temperature gases at the point of discharge:

2. The heat loss caused by discharge of hotter material;

3. The danger of material sticking at wet end because of reduced temperature of drying gases and their greater moisture content.

The *rotary steam tube dryer,* while operating on the counter current principle, does not have the same limiting factors. For this reason, it will be discussed separately.

Reversed current circulation makes possible the utilization of the good points of the other two systems. As the heat transfer from the gas through the shell is much less than that of the gas itself to the material, higher initial gas temperatures can be used. The comparative merits of the various applications of this principle will be discussed under *direct-indirect dryers.*

The Rotary Steam Tube Dryer —A rotary dryer in which heat is furnished by banks of steam tubes placed in concentric circles inside the cylinder and rotating with it, is called a rotary steam tube dryer. It is one of the most efficient continuous dryers because of more complete distribution of heat through: (*a*) conduction (direct transmission of heat from steam tubes to products in contact with them); (*b*) radiation (diffusion of heat from steam tubes to products in vicinity of tubes); and (*c*) convection (transmission of heat by circulating air previously heated by steam tubes).

Among the advantages found in the best types of rotary steam tube dryers are:

1. Elimination of case hardening, by the use of counter current circulation;

2. Material is not injured by heat, as the evaporating conditions maintained are such as to keep the product

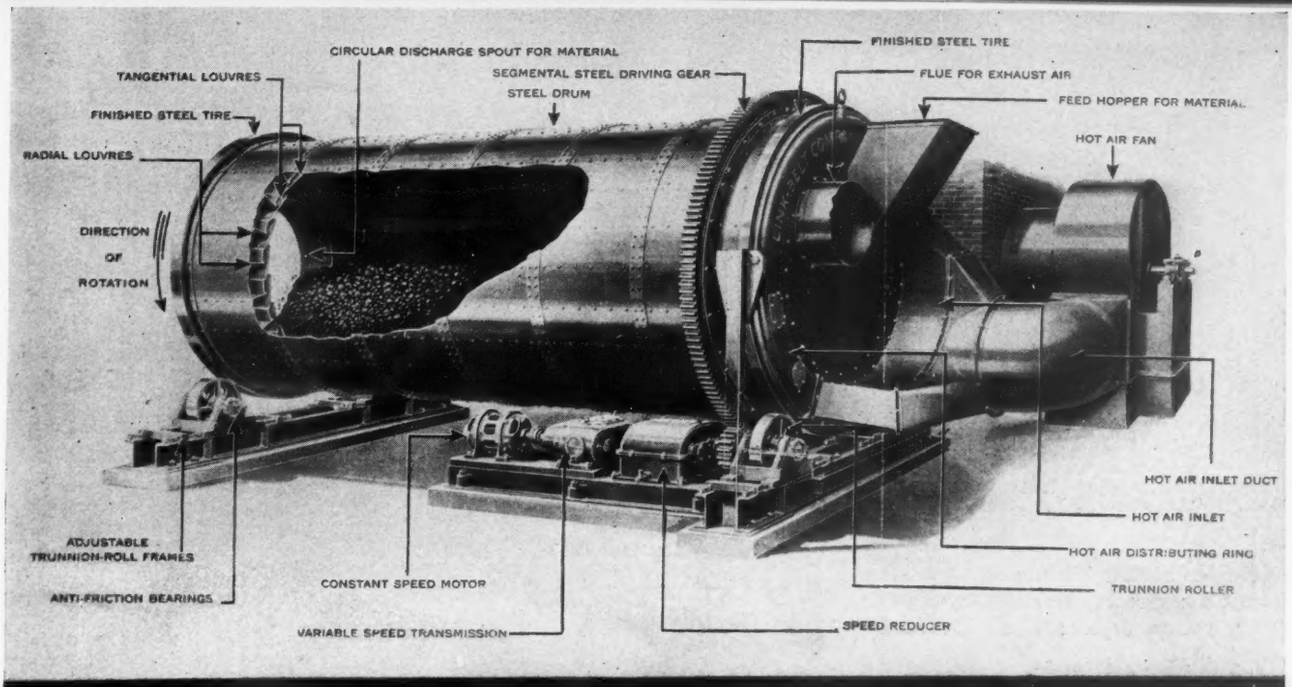


Fig. 28 — Cut-away view of a "Roto-Louvre" dryer

at a very low temperature (120 to 140 deg. F., or 50 to 200 deg. F. lower than that of the steam in the tubes);

3. Radiation losses are small because (*a*) the heat losses through the shell of the cylinder are small due to comparatively low operating temperatures, and (*b*) the stack losses are also small because of low temperature of exhausted air and small volume of air used;

4. Ease of control, as the operating temperature is definitely set by the steam pressure;

5. Small entrainment losses, as the air circulation through the dryer is reduced to that necessary to carry off the vapors;

6. Unit is self-cleaning to a large extent, as contrary to the prevailing belief, many wet materials can be processed without danger of sticking, partly as a result of the constant expansion and contraction of the tubes, and also because a very wet material generally will not stick to a metal surface which is so hot as to cause instantaneous evaporation;

7. High thermal efficiency (the writer has carried tests on Louisville dryers and obtained thermal efficiencies of 85 per cent). Figs. 18, 19 and 20 illustrate the general features of rotary steam tube dryers.

A special application of the rotary steam tube dryer principle to very free flowing products of low initial moisture content is exemplified by the Nordyke rotary dryer illustrated in Figs. 21 and 22. The exterior casing is stationary, but the lifting blades and steam tubes rotate. The revolving cylinder is shown in Fig. 22. The function of the blades is to scrape off the material lying on the bottom of the casing and repeatedly cascade it through the almost solid bank of coils of the rotating drying cylinder. Natural draft is used. The heat transmission is done almost entirely by conduction.

Rotary dryers classified on basis of

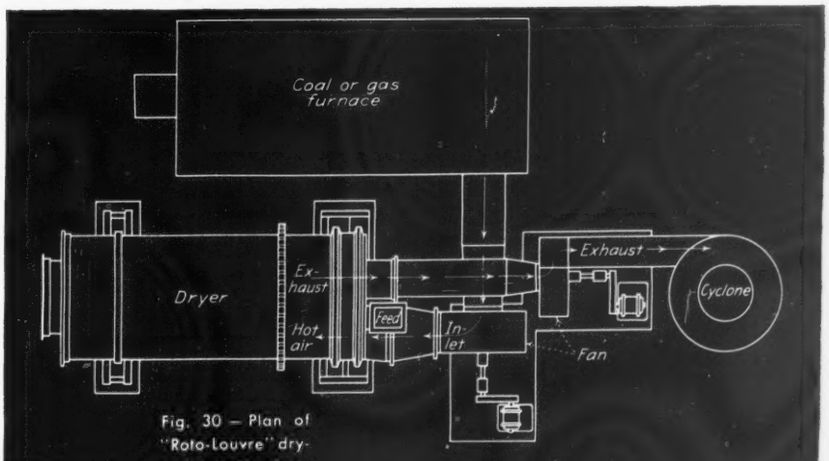


Fig. 30 — Plan of "Roto-Louvre" dryer installation.

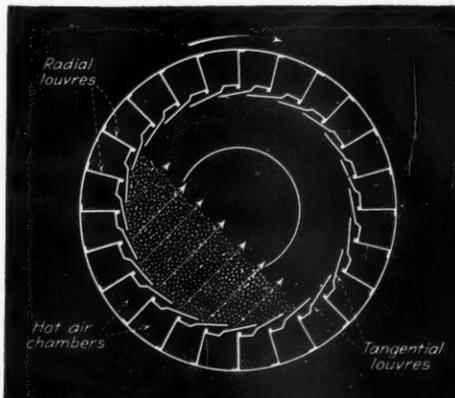


Fig. 29 — Cross-section of a "Roto-Louvre" dryer

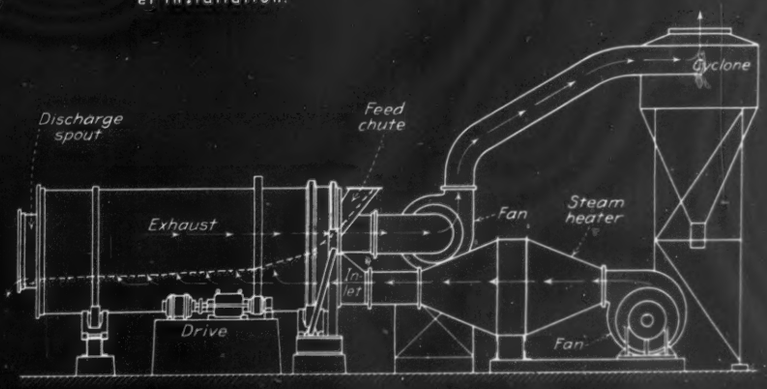


Fig. 31 — Elevation of "Roto Louvre" dryer installation

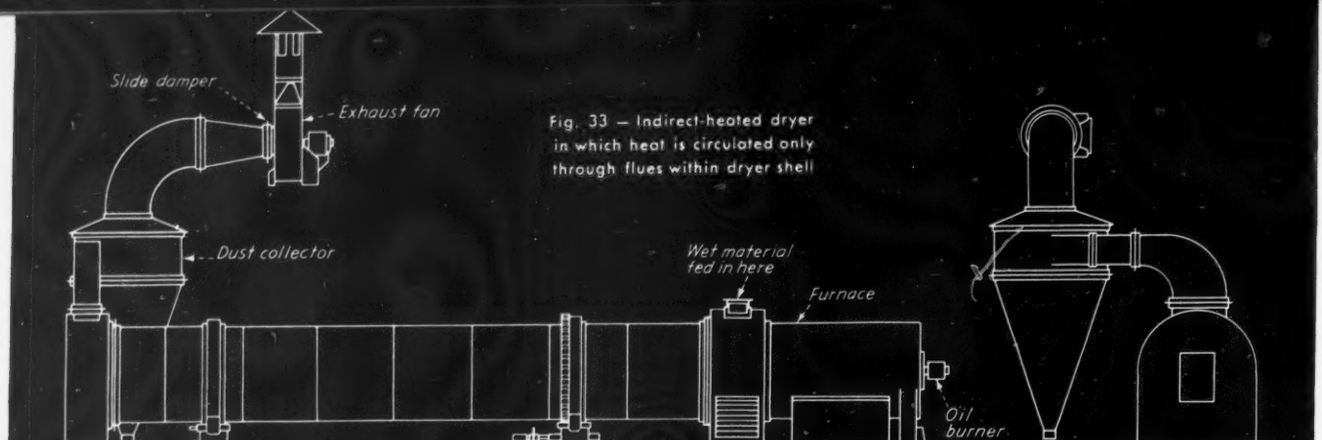


Fig. 33 — Indirect-heated dryer in which heat is circulated only through flues within dryer shell

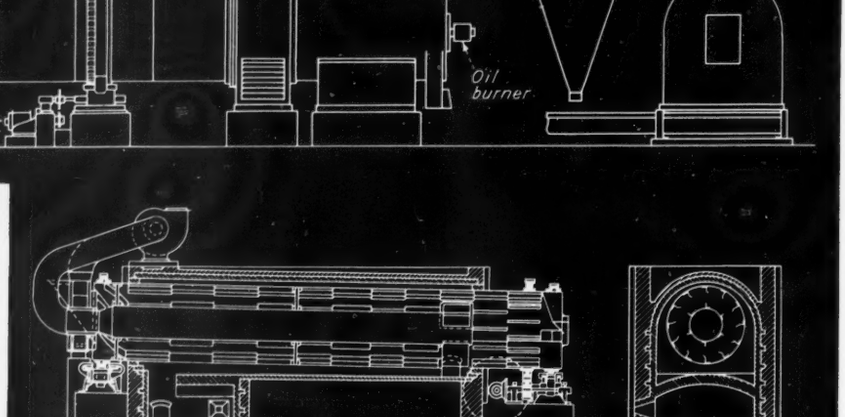


Fig. 32 — Indirect heated rotary dryer in which heat circulates outside shell and is then recirculated within a central flue

application of heat fall into three main categories: direct rotary dryers; indirect rotary dryers; direct-indirect rotary dryers.

Direct Rotary Dryers—The material is in direct contact with the drying medium. These dryers are subdivided as follows:

1. Air dryers—The air is preheated by steam coils outside the cylinder;
2. Products of combustion dryers—Air is mixed with products of combustion from furnace outside cylinder;
3. The "Roto-Louvre" dryer;
4. The "Ardrier".

Indirect Rotary Dryers—The material does not come in contact with the drying medium. These dryers are subdivided as follows:

1. When heat is applied to exterior of drying cylinder;
2. When heat is applied as in (1) but recirculated through a central flue;
3. When heat is transmitted through flues passing inside the cylinder and parallel to its longitudinal axis.

Direct-Indirect Rotary Dryers—A combination of the two preceding classifications, subdivided as follows:

1. Products of combustion first heat exterior wall of cylinder and then pass through the cylinder itself;
2. Products of combustion first heat the exterior wall of a cylinder split into four segments, and then return through the segments;
3. Products of combustion first pass through the cylinder but inside a central flue, and then return through the annular space between flue and cylinder;
4. Products of combustion first pass through special flues built on the inside walls of the cylinder and then return through the central portion of the cylinder.

Air Dryers (direct rotary dryers) are commercially referred to as indirect steam dryers. They are similar in general appearance to the rotary steam coil dryer except that the steam coils are banked at the exterior of the dryer on the air inlet side and are stationary. This type finds its greatest application in low temperature drying where the products cannot be exposed to the higher temperatures of the steam coils. The design and distribution of the lifting flights plays an important part in the efficient operation of the unit which must be specially adapted for the products handled.

One well-known manufacturer of this equipment reports an evaporation of 0.75 lb. of moisture per hour per cu.ft. of cylinder volume for material carrying 5 per cent moisture. It is obvious that this type of dryer utilizes heat transfer in only one way: convection. As a consequence, its thermal efficiency is low, somewhere around 30 per cent. Figs. 23 and 24 illustrate this type of dryer.

Products of Combustion Dryers (direct rotary dryers) are similar in construction to the indirect steam dryer previously discussed, with the exception that the products of combustion replace the heated air. These dryers operate at a higher temperature angle, as a rule. The system is adaptable to parallel or counter current circulation. Higher temperature of drying gases is desirable for the following reasons: a greater thermal efficiency results from greater utilization of heat and varies from 50 to 80 per cent; a reduced amount of gases need be circulated through dryer because of the increased moisture carrying capacity of the hotter gases.

The increase in moisture carrying capacity in this dryer is astonishingly great. For instance, 1 lb. of air at 100 deg. F. and 60 per cent saturation can carry 0.025 lb. of moisture. At 150 deg. F., this amount is increased to approximately 0.12 lb. or 4.8 times the weight of moisture. At 200 deg. F., it has become 1.36 lb. of moisture or 54.5 times the original quantity of moisture. A reduction in the amount of gases circulated brings in a corresponding reduction in the cost of circulating and collecting equipment and minimizes the entrainment of the product.

Figures 25, 26 and 27 illustrate products of combustion dryers (rotary dryers or direct rotary dryers).

The **"Roto-Louvre" Dryer** (direct rotary dryer), operates either on heated air or on products of combustion. The application of drying principles is entirely different from that of the rotary dryers previously discussed. The dryer was originally developed in Sweden and England, and was brought to this country in 1935 by Link-Belt Co. The revolving cylinder has the general appearance of that of the other types, but

the method of introducing the drying air or gases is entirely different. The cylinder is closed at the feed end and opened at the discharge end. Instead of the inside cylinder wall being lined with lifting paddles, it is double, with a series of internal channels. These are faced with tangential plates having an open overlap. The function of the overlap is to provide a passage for the drying medium from the inside of the channels into the cylinder. The circulation is limited only to those channels immediately underneath the material inside the cylinder. This forces a constant current of drying gases or air through the charge which is constantly agitated by the rotation of the cylinder. In Fig. 29 is a cross-sectional view of the cylinder. The drying medium is forced into the hot air chambers of the cylinder through air passages provided in the head piece and connected with the hot gases inlet, as shown in Fig. 28. The rotation of the cylinder is always such as to make the air gap in the tangential louvres face downward. Gravity and the pressure of drying gases thus prevent the material from penetrating into the hot air chambers.

This system is reported to give unusual flexibility to the drying unit and permits the handling of a very wide range of products from granular materials such as corn, coffee, and salt, to sticky products like sewage sludge or shrimp waste. The operating temperature of the drying medium is limited only by the drying characteristics of the products. Figs. 30 and 31 are additional illustrations for this dryer.

The **"Ardrier"** (direct rotary dryer), made by Heil Co. has one distinctive feature: both the products of combustion and the material travel three times through the drying cylinder. The resulting efficiency of this circulation is very high, but limits the application of the dryer to products which will not stick or clog in the annular passages. The hottest gases are fed into the central cylinder, thus insuring minimum radiation losses. One interesting claim made by the manufacturer is that the machine provides automatic separation of the light and heavy particles. Very light particles may clear through and become perfectly dry in as short a time as 30 seconds, whereas heavier particles may take 3 to 4 minutes to do so. Since the entering gases are at very high temperatures, from 1,000 to 2,000 deg. F., this feature is absolutely essential to avoid the burning of light particles. This machine illustrates the point previously made as to the possibility of using high temperature drying gases for certain food products having extremely rapid moisture diffusion. It is claimed that the material remains at 150 deg. F. or below. The cost of drying averages from $4 to $6 per dry ton, depending on the material, and the costs of labor, fuel and power. This cost applies to forage products.

Indirect Rotary Dryers—First, consider those in which heat is applied to the exterior of the drying cylinder. The heat transfer is governed by the metal used in the fabrication of the cylinder. Heat is first transmitted by conduction through the cylinder wall and then by conduction and radiation to the material. The factor of heat utilization is therefore rather low, and the thermal efficiency seldom runs above 50 per cent. This design has some advantages in processing materials containing large amount of fine dust, because of the absence of strong air currents within the cylinder. Its application to food products is very limited because of higher temperatures required for efficient operation.

Second, consider those indirect rotary dryers in which heat is applied as in the first group, but recirculated through a central flue. The efficiency of this type is just a little higher than the single pass indirect type, because of only 15 to 20 per cent of the total heat being added by the central flue. This system of drying also finds little application in the food product industries. Fig. 32 illustrates the construction.

Finally, there are those indirect rotary dryers in which heat is transmitted through flues passing inside the cylinder and parallel to its longitudinal axis. The products of combustion are led through openings in the cylinder shell and flow into a series of longitudinal ducts of special construction fastened to the interior of the shell. The gases are exhausted through a gas tight hood. (See Fig. 33). This system has many applications in food industries, for its action is similar to that of the steam tube rotary dryer. The restricted path of the heating medium does not permit as high an efficiency, nevertheless efficiencies as high as 65 per cent, referred to the fuel, are common in practice. This system can be made in parallel or counter current designs.

Direct Indirect Rotary Dryers—There are four types of these dryers available, as follows:

1. Those in which the products of combustion first heat the exterior wall of the drying cylinder and pass through the cylinder itself. This type is manufactured mostly for non-food applications, being more generally limited to high temperature drying. The C. O. Bartlett-Snow Co. report fuel consumption of about 1 lb. of coal (13,000 B.t.u.) for every 6 lb. of moisture evaporated on products carrying 10 to 15 per cent moisture.

2. Those in which the products of combustion first heat the exterior walls of a cylinder split into four segments, and then return through the segments. The splitting of the cylinder furnishes 75 per cent more heating surface. Since more heat is absorbed through the walls of the segments, the returning gases are at lower temperature, a distinct advantage for food products handling. This type would require granular and non-sticky products for smooth operation. The overall thermal efficiency obtainable with this method can be as high as 85 per cent. This corresponds to an evaporation of 8 lb. of moisture per lb. of coal (13,000 B.t.u.).

3. Those in which products of combustion pass through the cylinder, but inside a central flue, and then return through the annular space, also known as the double shell type. By passing the hottest gases inside the cylinder, better heat transfer is effected and the cylinder radiation losses reduced. In

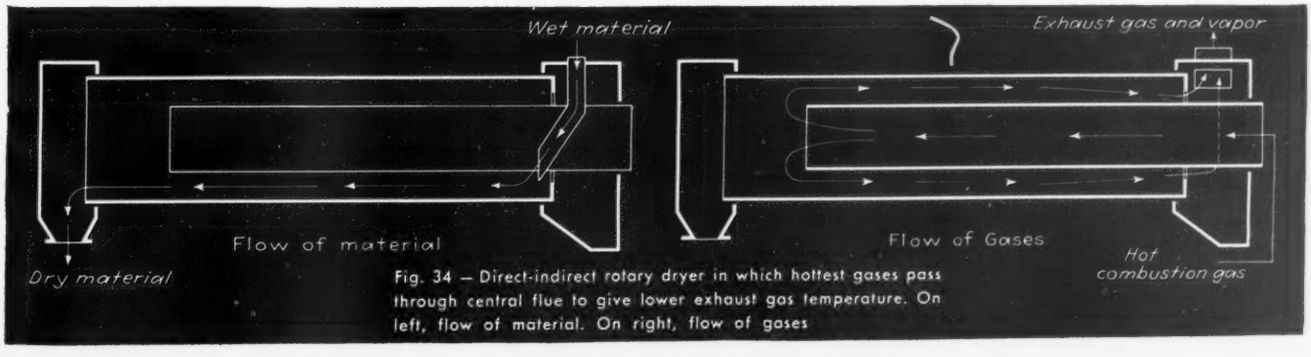


Fig. 34 — Direct-indirect rotary dryer in which hottest gases pass through central flue to give lower exhaust gas temperature. On left, flow of material. On right, flow of gases

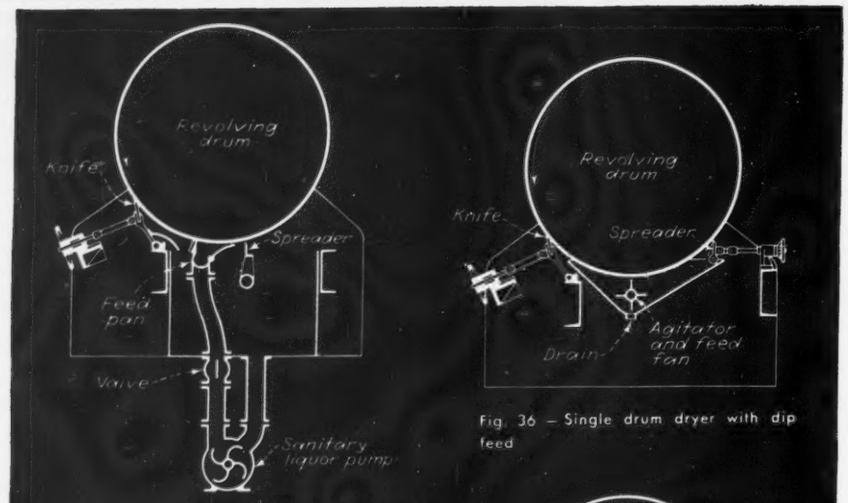


Fig. 35 – Single drum dryer with pan feed

Fig. 36 – Single drum dryer with dip feed

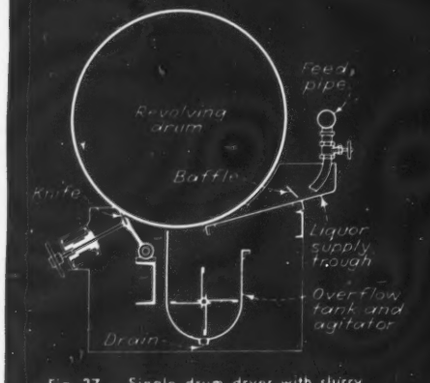


Fig. 37 – Single drum dryer with slurry feed

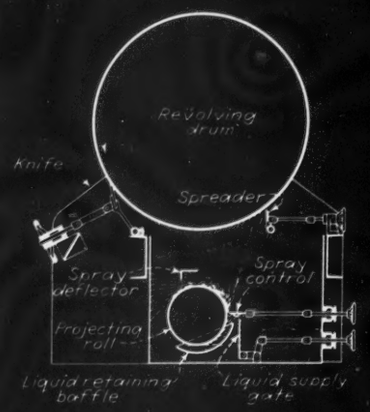


Fig. 38 – Single drum dryer with spray film feed

this manner the dry gases come in contact with the dry material, and the moist gases are withdrawn at the feed end. This makes possible lower exhaust temperatures and increased thermal efficiencies. See Fig. 34 for illustration.

4. Those in which products of combustion first pass through special flues on the inside wall of the cylinder and then return through the central portion of the cylinder. They are essentially similar to the dryer described in the third case under "indirect rotary dryer," with the exception that the gases are exhausted back into the cylinder instead of to the atmosphere. This construction makes fullest utilization of the heat furnished, and offers one of the most efficient methods of drying. Thermal efficiencies of 85 per cent are common. The rapid evaporation and low outlet gas temperatures permit the handling of delicate organic materials.

Drum Dryers—This type of dryer is designed for handling dilute and concentrated solutions, slurries, material which becomes super-saturated by evaporation, pastes, sludges, and many fruits and vegetables—either raw or precooked.

The material is fed on the outer surface of a steam heated revolving drum. The rotation of the drum is so timed that, by the time the product has rotated to a certain position, the material is dried and is scraped off the drum by means of a knife. The controlling factors are the thickness and distribution of the food film on the drum, the speed of rotation of the drum, the temperature of the outer drum surface, the position of the knife, the knife angle with respect to the drum surface, the tension of the knife blade, and the removal of vapors.

Some of the advantages of drum drying are:

(*a*) Possibility of drying heavy viscous and adherent liquors because:

1. Products are constantly subjected to heat and the viscosity is lowered;
2. Precipitates from drying solutions adhere to the drum surface;
3. Drying is uniform because the material is spread out thin; and
4. Dried products are removed as soon as dried.

(*b*) Conversion of liquids to solids in one single continuous self-cleaning operation.

Drum dryers may be classified as follows:

Atmospheric, single drum type
double drum type
Vacuum, single drum type
double drum type

Atmospheric Single Drum Dryers—These are especially applicable to drying sticky and viscous materials, and delicate hygroscopic or plastic fruit products. This can be accomplished without appreciable loss of vitamins, food value or taste.

There are five principal methods of applying the feed to the drum. Figs. 35, 36, 37 and 38 illustrate four methods. The fifth one will be discussed under the Sardik Drum Dryer.

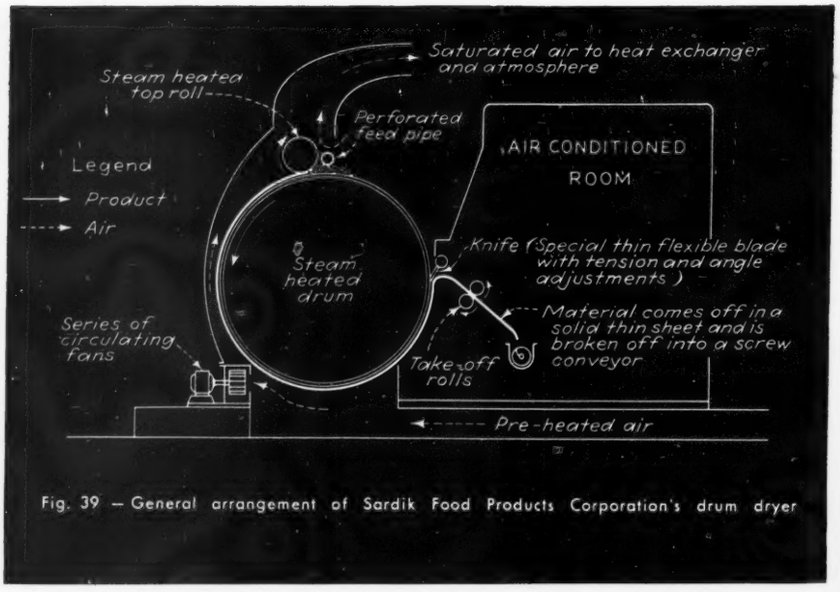

Saturated air to heat exchanger and atmosphere
Steam heated top roll
Perforated feed pipe
AIR CONDITIONED ROOM
Legend
Product
Air
Steam heated drum
Knife (Special thin flexible blade with tension and angle adjustments)
Material comes off in a solid thin sheet and is broken off into a screw conveyor
Series of circulating fans
Take-off rolls
Pre-heated air

Fig. 39 – General arrangement of Sardik Food Products Corporation's drum dryer

Sardik Dryer—This dryer, manufactured by the Sardik Food Prod-

Fig. 40 — View inside the collecting chamber of a Sardik drum dryer. The chamber is air conditioned. Through the windows are seen the drum and the pipelines to the feed pipe

ucts Corp., New York, N. Y., is designed for handling food products. It has some distinctive features which render the dryer particularly suitable for processing highly hygroscopic and plastic food products. The general arrangements are shown in Fig. 39. In Fig. 40 is shown the inside of the air-conditioned collection chamber. Through the plate glass windows can be seen the drum and the lines to the feed pipe. The solid sheet of dried material (cranberries in this case) can be seen coming from underneath the knife holder to the take-off rolls which keep it in tension. The perforations which show through the sheet admit a stream of conditioned air underneath the sheet. From the take-off rolls, the sheet is fed into the screw conveyor (directly in front of operator). The sheet is broken into flakes by this conveyor and loaded into metal containers by the wood flight conveyor shown at rear. The drum controls are all inside the chamber.

Fig. 41 illustrates the form of a sheet coming off an experimental Sardik drum. Note the crepe like form of the film. This diaphanous crepe form greatly increases the solubility of the product. An idea of the magnitude of this increase can be obtained from these figures: one gram of pectin dried in this form (160 grade citrus pectin) in a film of 0.0045 in. thick, has a surface of 400 sq.in.

This crepe effect is produced by the pattern of the material laid on the drum surface by the top roll and by the action of the scraping knife which shrivels up the very thin film into a shrunk crepe sheet. Fig. 42 shows an apple film on the drum surface. Note the distribution of the material into a porous mass which permits freer evaporation and quicker drying.

Fig. 41 — Sheet of dried pectin coming from drum of an experimental Sardik dryer

Atmospheric Double Drum Dryers—These embody the same general principles of the single drum dryers discussed, but provide greater capacity and greater economy of space and equipment. The methods of feed are illustrated in Figs. 43, 44, 45, 46 and 47. The thickness of the drying film is regulated by the clearance between the drums. An additional control is obtainable by regulating the level of the liquor between the drums.

Vacuum Dryers—Vacuum drying offers two distinct advantages: the use of very low drying temperatures; and the elimination of oxidation through the presence of air. Secondary advantages are: utilization of low pressure exhaust steam or hot water as heating medium; uniform drying conditions since atmospheric external conditions do not affect the operation; elimination of dust, odors, fire or explosion risks.

The operating temperatures are set by the degree of vacuum which is maintained within the dryer. This range of temperature can be found by consulting a steam table. For vacuums of 29 in. of mercury, the product would be exposed at only 75 deg. F.; or less than summer heat. An operating temperature of 100 deg. F. would require a vacuum of approximately 28 in. of mercury; 120 deg. F. would require 26 in. vacuum; and so on. Present commercial vacuum dryers with high vacuum equipment maintain vacuums of 28½ and 29 in. of mercury.

The vacuum process is especially applicable to products which present the following limitations of treatment:

1. The moisture diffusion rate through the product is insufficient to cool it by evaporation.
2. The product cannot be heated over 120 to 140 deg. F.
3. The product cannot be exposed to air when drying.

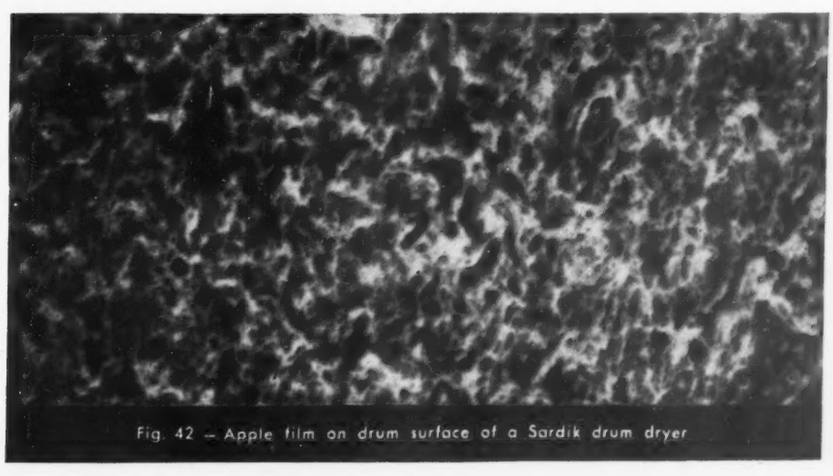


Fig. 42 — Apple film on drum surface of a Sardik drum dryer

4. The product is treated with volatile solvents which must be recovered.
5. The products are explosive.

Vacuum Shelf Dryers—These are used for drying products which cannot be tumbled in the dryer. Pharmaceuticals, food extracts and animal glands belong to this category. The construction is shown by Fig. 49. The material is loaded on hollow metal shelves through which is circulated the heating medium. Transfer of heat is accomplished entirely by conduction; hence the products should be so loaded on shelves as to assure greatest possible contact. The extracted vapors are collected in a tubular condenser and the non-condensable gases are pumped out to the atmosphere.

Vacuum Rotary Dryers—These have the advantage of automatic loading and unloading, but are restricted to operation on materials which can be agitated or tumbled while drying. They consist of a stationary cylinder which is jacketed for heating by steam or hot circulating fluids, or else designed for electric heat. A special spiral agitator revolves inside the cylinder, which is closed at both ends. This agitator insures mixing and even distribution of the charge with minimum dusting. The material is loaded through an aperture at the top and discharged automatically through a discharge outlet at the bottom, as shown in Figs. 50 and 52.

Revolving Vacuum Dryer—This type is especially designed for materials which do not adhere to the heating surface and can be tumbled. It is shown in Fig. 51.

Flash Drying—This expression could be applied to some forms of rotary and all forms of spray drying.

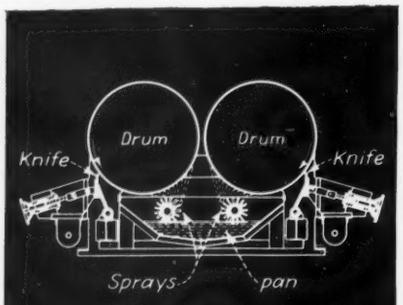


Fig. 43 — Double drum dryer with splash feed for solutions which form crystals

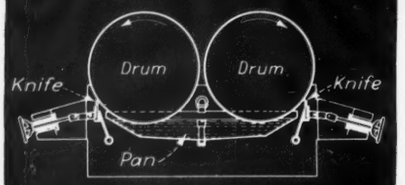


Fig. 44 — Double drum dryer with dip feed for solutions of high concentration likely to adhere to hot surfaces

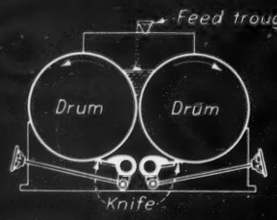


Fig. 45 — Double drum dryer with center feed for finished products of coarse texture and high moisture content

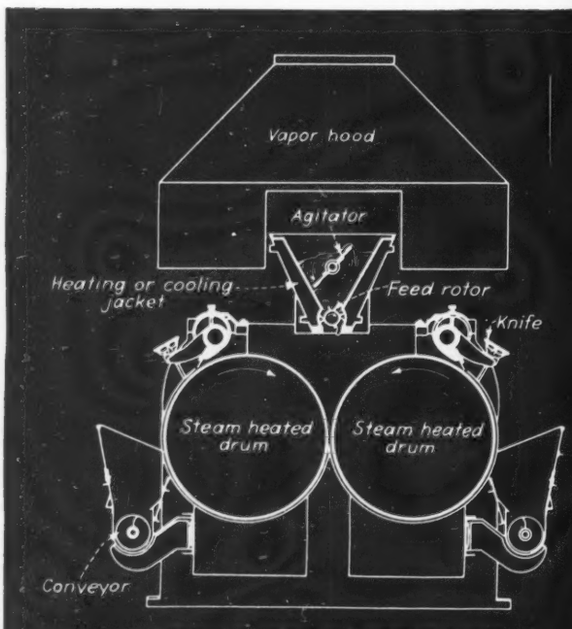


Fig. 47 — Double drum dryer with patented paste feed

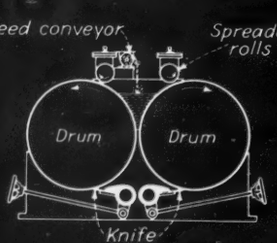


Fig. 46 — Double drum dryer with center feed, arranged with spreader rolls for controlling drum coating and conveyor for uniform feed of heavy material

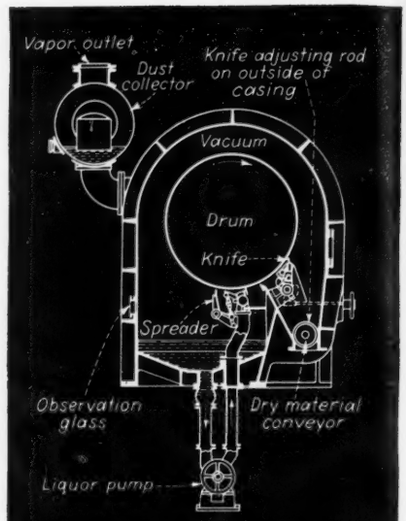


Fig. 48 — Vacuum drum dryer for low temperature drying of foods sensitive to heat

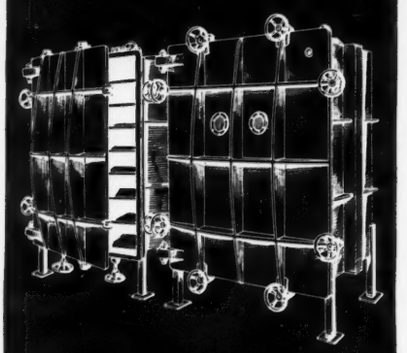


Fig. 49 — Vacuum shelf dryers, one with door open to show shelves

In this article, it will be used to describe a novel method of drying developed by Raymond Brothers Impact Pulverizer Division, Combustion Engineering Corp., Inc. It combines pulverization and drying in such a manner as to make possible extremely rapid evaporation. This is accomplished by blowing products of combustion into a kiln mill and evaporating the moisture from the finely divided particles of product while they are in the process of being broken up and are therefore in constant violent agitation. The process can be applied equally well to materials that are already disintegrated.

For very wet materials, it is the practice to dewater on a filter or other continuous mechanical dewatering devices. If the product thus treated is still excessively wet, it is often mixed with previously dried material. This practice, incidentally, is quite commonly applied in rotary dryers to prevent sticking and obtain a more homogeneous moisture distribution resulting in faster drying.

High inlet temperatures, from 600 to 1200 deg. F. for the drying gases

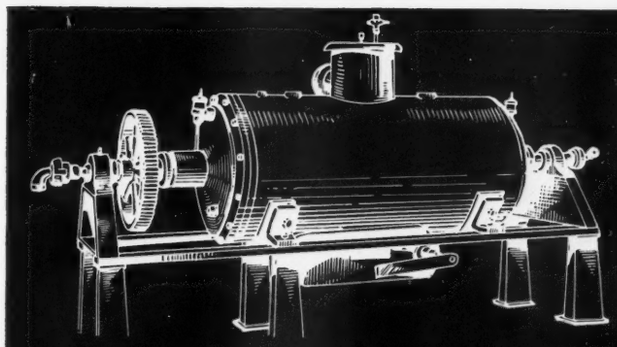


Fig. 50 — Vacuum rotary dryers of this design are completely water jacketed so that material is cooled before discharge to avoid oxidation

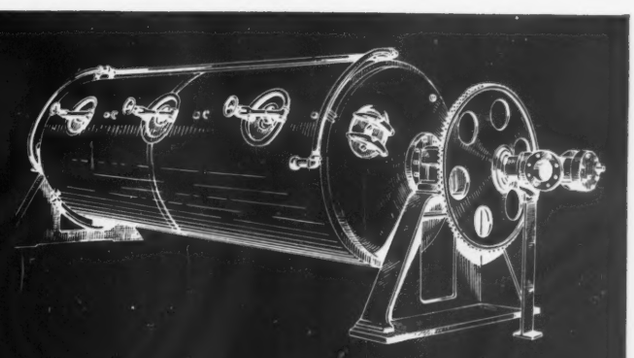


Fig. 51 — Revolving vacuum rotary dryer with steam heated jacket

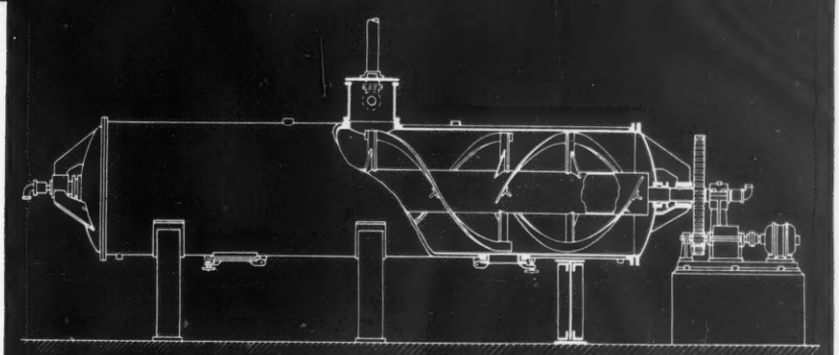


Fig. 52 — Interior construction of a vacuum rotary dryer of type used for starch and similar materials that do not adhere to heating surface and can be tumbled

are used. The evaporation rate is so rapid that the product itself is seldom heated above the wet bulb temperature. This almost instantaneous evaporation is produced by tremendous agitation of the product particles, large exposed area of product by fine divisions, high rate of circulation of drying medium, and high temperature gradient between drying medium and product. The dried material is separated in special types of dust collectors which may operate in series, providing for constant air cooling of the finished product. The complete drying cycle requires only about ten seconds.

The essential design of this system causes perhaps a wider range of thermal efficiencies than would be expected. This is because the drying depends in such large measure on the rapidity with which moisture will flow to the exposed surface of different materials. Heat requirements of 1750 to 1500 B.t.u. per lb. of water evaporated are reported as common practice.

Spray Drying—This system is similar to the one just described in the sense that the drying cycle is practically instantaneous, but it differs in that the materials are handled in one step from solution to finished powder. This eliminates intermediary processing operations such as mechanical dewatering and pulverizing, but does involve vacuum concentration for very dilute solutions.

Spray drying has now reached such a degree of perfection that its greater application to processing food products is well worth recognizing. It is not limited to solutions and can be successfully used on finely ground products. The operation is entirely automatic, once the controls are set. With recirculation, the thermal efficiency compares favorably with the more efficient dryers. On the basis of unit operation, the entire plant is no more costly than others and permits obtaining finished material within a few seconds.

Much of the success of the operation depends on the completeness of the atomization of the product and the heat distribution in the desiccating chamber. There, again, maximum advantage is taken of all the factors of drying.

A high turbulence is also used to break the moisture film surrounding each minute particle. The removal of this insulating film of vapor makes it possible for dry air to come directly in contact with the wet surface of the product. This establishes a much greater vapor tension and results in a maximum rate of evaporation.

The author has used this system with excellent results on delicately flavored, highly hygroscopic and plastic fruit products. The evaporation is so rapid as to insure constant cooling of the particles to a safe temperature for retaining food value and vitamins, and preserving original flavor to an astonishing degree. Special air conditioning collection systems are used in the case of such products.

There are two systems of spray drying, differing in the method of atomization: the pressure nozzle and the spray wheel systems.

Pressure Nozzle System of Spray Drying—This system, developed by C. E. Rogers Co., Detroit, and Douthitt Corp. (Gray-Jensen system) Chicago, is one of the standard methods of manufacturing powdered milk. Fig. 53 illustrates a typical plant. Air is drawn through air filters at the upper right. It is then passed through fin type steam heaters and blown into the spray chamber through large air nozzles. The product, preconcentrated in vacuum pans, is pumped under high pressure to special non-clogging spray nozzles which are located at the center of each air nozzle. The atomization at the nozzles is so complete, and the turbulent action of the air and product particles so violent, that the drying is practically instantaneous. As a consequence, the temperature of the heated air is reduced so rapidly that by the time the particle is dry it is exposed only to low temperature air. The product itself always remains at wet bulb temperature till it reaches the cool zone. Most of the powder falls on the floor of the chamber. The powder which is entrained is caught in a bag type dust collector with a continuous unloading device. In batch operation the product is pushed into the hopper with a floor brush. In continuous operation it is removed as it accumulates. The drying chamber is so proportioned as to occupy a comparative small amount of floor space and only requires from 12 to 14 ft. of ceiling clearance. Only one man is required for the operation of the dryer.

An idea of the effectiveness of the complete operation, as related to man-

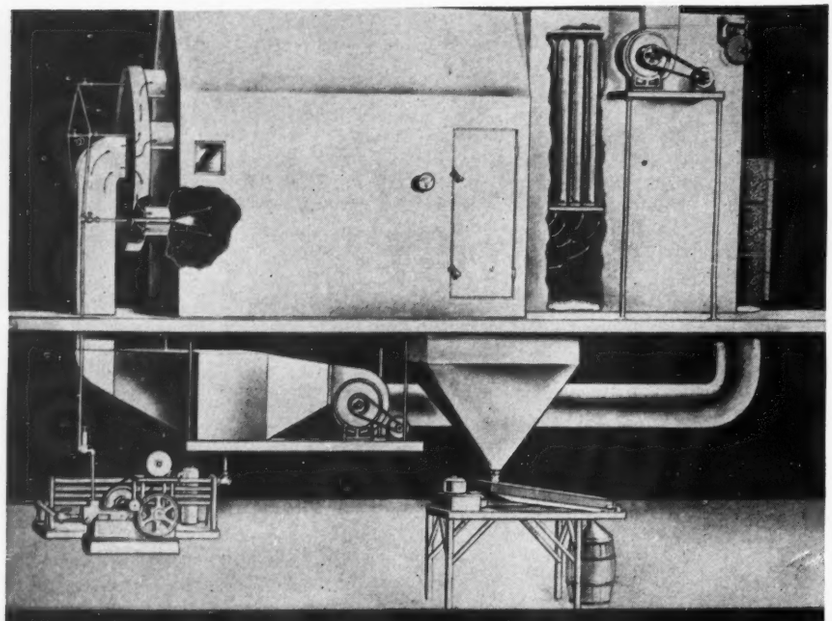


Fig. 53 — Spray dryer of the pressure spray nozzle type

ufacturing powdered milk, can be obtained from these cost figures: including cost of steam, electric power, labor, and package, the cost of drying from raw product to finished product is 1½ to 2½ cents per pound of milk powder, depending on size of plant and local conditions.

This system is generally limited to food products which can be placed either in solution or in the form of a very fine suspension.

The Spray Wheel System of Spray Drying—In this case the atomization is accomplished by means of a centrifugal atomizer revolving at from 6,000 to 18,000 r.p.m., according to the design of the wheel and the fineness of the finished powder. There are a number of spray dryers of this type offered as standard equipment on the market.

The Bowen spray dryer (spray wheel system) is manufactured by the Bowen Research Corp., Garwood, N. J. Fig. 54 illustrates the construction. Hot air from any convenient source or products of combustion enter at *A* and *B*. That entering at *A* is swirled directly downward around the spray wheel at *H*. That entering at *B* comes into the chamber through vertical inlet nozzles *D*. It is so directed as to prevent sprayed material from impinging on the upper walls of chamber. Manifold *J* is used to cool the dried product. The rotation of the product and the drying medium is all clockwise. The product particles are dried by the time they reach the floor of the desiccating chamber. They are then blown by a

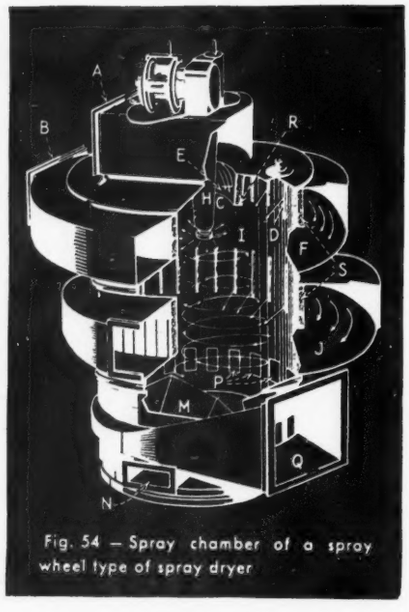


Fig. 54 — Spray chamber of a spray wheel type of spray dryer

rotating air sweeper into the induced draft outlet, *Q*. The finished product is separated in suitable dust collectors. The thermal efficiency of the unit varies with the product and drying temperatures from 45 to 50 per cent. Considerably higher efficiencies are obtainable with recirculation of the drying medium.

The Peebles Spray Dryer (spray wheel system) is manufactured by Western Precipitation Corp. Its distinctive feature is the method of reversed air recirculation which produces two stage drying. Fig. 55 illustrates the general construction. The drying medium may also be from any source. It is introduced at the bottom of the desiccating chamber as shown and is given a rapid rotary motion by inclined vanes, so that it strikes the finely atomized spray from the wheel.

These are drying mediums for high temperature gases. They are immediately cooled by the instantaneous evaporation and travel in the cooler outer zone where they are recirculated by a special fan which reverses the direction of the current. It is in this cooler that the end drying is completed. Spray drying, when thus applied, produces rapid evaporation with high heat on saturated products and finished drying at low temperatures. The reversed current principle thus effects notable economy in greater utilization of heat and reduction in size of the drying unit. The finished product is generally collected in multicone dust collectors, where 100 per cent recovery is claimed.

Acknowledgment is made of information provided for the preparation of this article by the following firms: Allbright-Nell Co.; Allis-Chalmers Mfg. Co.; C. O. Bartlett & Snow Co.; Bowen Research Corp.; Buffalo Foundry & Machine Co.; Duff Patents Co., Inc.; L. R. Christie Co.; Philadelphia Drying Machinery Co.; Heil Co.; Link-Belt Co.; Louisville Drying Machinery Co., Inc.; Proctor & Schwartz, Inc.; Raymond Pulverizer Division, Combustion Engineering Corp.; C. E. Rogers Co.; Sardik Food Products Corp.; F. J. Stokes Machine Co.; Struthers-Wells Co.; and Western Precipitation Co.

REFERENCES

"Principles of Chemical Engineering," by Walker, Lewis and McAdams, McGraw-Hilll Book Co., New York, 1937.

"Flash Drying for Materials of High Moisture Content," paper by Richard F. O'Mara, presented at meeting of American Society of Mechanical Engineers, Metropolitan Section and Process Industries Division, April 9, 1936.

"Rotary Dryers," paper by Benjamin A. Smith, presented at Drying and Air Conditioning Symposium, American Chemical Society, University of Pennsylvania, December 28, 1937.

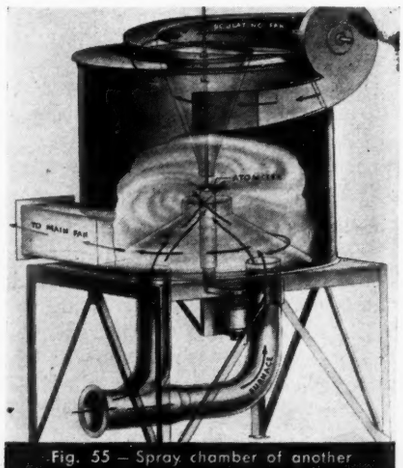


Fig. 55 — Spray chamber of another spray wheel type of spray dryer

New MILK CONTAINER

Lowers Retail Price

Two-quart size paper container introduced in New York City. Expected to reduce distribution costs and increase consumption.

DAIRIES in recent years have been attempting to switch from the conventional glass quart milk bottle to the quart paper container. The paper milk container has been a lure because it had promised possible reductions in the consumer price of milk.

Washing and cleaning, filling, delivering, collecting and replacing lost or broken glass milk containers have for many years accounted for a large portion of the cost of distribution. And the cost of distribution has accounted for a very large portion of the final price of milk.

With all its apparent advantages—savings in waste and handling cost—economies in trucking and delivering costs; elimination of washing labor and washing equipment, and overhead; the paper container has rarely effected any money saving to the consumer. Even considering the savings

Food
DISTRIBUTION

in glass bottle replacements, which in New York City area alone is approximately 16,000,000 bottles per year, the paper container has so far brought to the consumer convenience but little saving.

It must be admitted that the paper container has had obstacles placed in its path such as the trade barriers erected by health departments (FOOD INDUSTRIES, February, 1939, p. 87). However, the fact remains that if economies have been effected in the paper quart milk container, they have rarely reached the housewife.

Last month the paper milk container for home delivery went into use in New York City. Its introduction was accompanied by a 1½ cent per quart reduction in the home-delivered price to the consumer.

The new paper container is a 2-qt. container. This is not the first time that a 2-qt. container has been used for milk, but this home distribution of milk in 2-qt. containers by both Sheffield Farms Co. and Borden Co., promises to be a large-scale application of the idea. Started in the Borough of Brooklyn, the 2-qt. paper milk distribution is to be extended throughout the metropolitan area as rapidly as possible.

The 2-qt. containers come to the dairies fabricated, sterilized and sealed. The seal is broken by machine. Filling and resealing of the paraffined containers are also machine operations, as is the final capping with a transparent cellulose heat-sealed cap.

There is no precedent in the New York area for the 2-qt. container. There is, however, a large distribution of 1-qt. paper containers. More than 50 per cent of New York's milk distribution is through retail stores. Half of this distribution is in paper containers. Approximately 5,000,000 paper containers are used in New York per week.

The reduction in home delivery price of 1½ cents per quart to consumers who purchase the 2-qt. milk container is possible because of savings all along the line. According to the reports of the New York companies introducing the 2-qt. paper container, there are many advantages in favor of the new fiber container. The filled fiber container weighs 40 per cent as much per quart as the filled glass container, and occupies one-half as much space. This permits larger loads per truck or smaller trucks and lower truck operating costs per quart.

Ice requirements for refrigerating the paper container are about 10 per cent of those for glass. The 25 per cent of the driver's time required to pick up empty glass containers is eliminated. This time can be used in efforts to increase the sales volume. Of course, bottle washing machinery and bottle washing labor costs are not necessary with the paper container. Neither is there a loss from broken or strayed glass bottles.

Two deep-rooted consumer habits must be overcome to assure the success of the 2-qt. paper milk venture. Users of the 2-qt. container must change their habits of a quart every day to 2 qts. every other day and also give up the traditional glass container for the paper.

The 2-qt. container does, however, offer the housewife inducements other than the saving of 1½ cents per quart. More milk can be stored in the refrigerator in less space and the empties can be discarded.

How easily housewives in Metropolitan New York can be persuaded to give up their habit of buying milk in glass at the rate of a quart per day is as yet unknown. However, if New York housewives react like upstate housewives, where an eight-months test has been conducted by both Borden and Sheffield, the conversion will be rapid. About 35 per cent of the customers in Rockland County, N. Y., where the paper 2-qt. container was tested for eight months, changed over to the 2-qt. container the first week it was offered, the remainder in about six weeks.

There is no plan to deny the 1-qt. glass container to those who insist on it. The preliminary testing indicates, however, that a 1½-cent-per-quart saving is sufficient almost completely to uproot supposedly unyielding habits.

If the results of this innovation follow the experience of the past, there will be no saving as a result of decreased number of route men necessary to deliver the volume. Any reduction in the price to the consumer by as much as 1½ cents per quart in the delivery price of milk is normally followed by an appreciable increase in consumption.

Milk in the new two-quart containers is easily handled. The same load goes in less space and weighs less.

The two-quart milk container takes up no more space in the refrigerator than a single quart bottle.

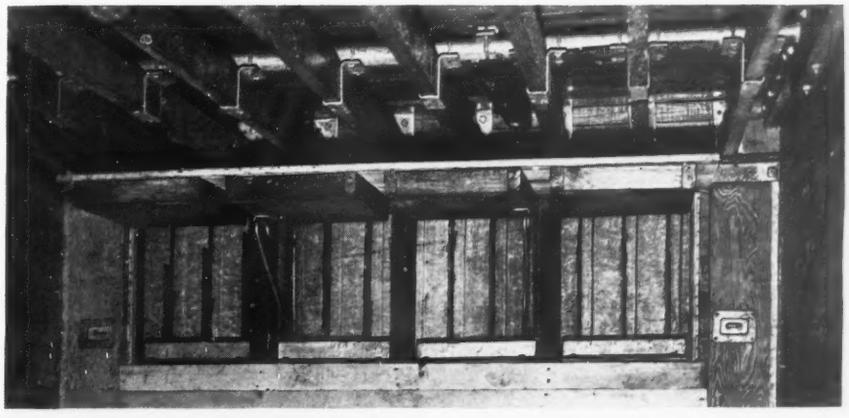
Hints and Hurdles

Solid CO_2 Refrigerator Car

THE PLEAS of the frozen food industry, asking the railroads to furnish refrigerator cars adequate for the transportation of quick frozen foods, have been heard and acted upon, not by the railroads, but by equipment manufacturers: The Liquid Carbonic Corporation and American Car & Foundry Company.

This new thermostatically controlled car will maintain a uniform 0° temperature throughout a four-day journey without icing in transit. The same car can also be used for the shipment of other foods which require refrigeration, such as fresh meat, poultry, eggs, fruits and vegetables. The variables are the amount of solid carbon dioxide placed in the bunker and the set of the temperature control valve.

Dry ice refrigerator car for frozen foods or other products needing refrigeration.

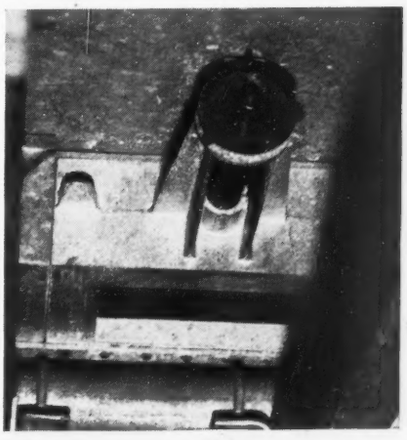


Front surface of dry ice bunker in dry ice refrigerator car, with insulated door of bunker open for filling.

Tonic for Associations

THE MULTIPLE MANAGEMENT plan (FOOD INDUSTRIES, Sept. 1938, p. 480) devised by McCormick & Co., Baltimore, Md., and put into operation by that company in 1933, has proved a profitable management tool not only to the McCormick company but to others who have applied it, except when it has been adopted with only feigned sincerity.

The Multiple Management plan delegates important advisory responsibilities to a large board of junior executives. These junior boards, functioning in several hundred industries here and abroad, where the Multiple Management plan has been adopted, have proved their ability to face the problems of both business and industry and solve them in a manner which would reflect credit on top executives and senior boards of directors. Many of these junior boards have demonstrated a more acute understanding of present day problems than their elders serving on the senior board.



Ceiling of dry ice refrigerator car showing regulator dial on thermostat, controlling temperature in a range from 0 to 55 deg. F.

The successful adoption of this management plan has not been confined to any groups of industries or types of businesses. Successful application has extended over a wide range of endeavors. The successes attained suggest the application of the plan to still other endeavors.

If the junior executives give a fresh and profitable viewpoint to industry, why can't the same juniors perform the same function for a group of allied industries?

Yes, we are thinking of industry and trade associations, many of which have been under the paternal guidance of the "same few" for far too many years. The juniors—the youngsters on the firing line—might better interpret the problems of today and determine more adequate solutions than those who are thinking in the terms and experiences of yesterday. This does not mean throw out the old heads, but rather give to them the benefit of "unguided" junior executive thinking.

Food DISTRIBUTION

If this plan is put into effect by industry and trade groups, and proves successful—and it will—there is still another application. Let selected juniors of industry and trade groups comprise an "unguided" junior board of the United States Chamber of Commerce. Should this ever happen and such a board's advice be taken seriously, the United States Chamber of Commerce might become the representative of business it is supposed to be and, furthermore, business might receive more sympathetic consideration at Washington. Also, business and industry might find themselves undergoing a mild and conservative form of housecleaning. Change is the substance of progress.

The Price of Government Aid —Public Ownership

THE FIRST IMPORTANT publicly owned enterprise in this country was the Postal system. Public ownership of the mails was condemned by many at the time. The introduction of the public school system was fought by those who contended that the government was depriving educators and teachers of a living. Today, many of the enterprises once privately operated are public utilities. Only 27 per cent of the water works of the country remain as private enterprises. They do but 11 per cent of the total water works business. The accompanying table shows the extent to which public ownership has replaced private enterprise in certain types of business endeavors.

Ownership and Operation of Utilities as Reported by 1,797 Cities over 5,000 Population*

Types of utilities	*No.*	*All Cities over 5,000 Per Cent of cities reporting*
Abbatoir	50	2.8
Airport	405	22.5
Cemeteries	634	35.3
Electric Distribution	72	4.0
Electric Light	259	14.4
Gas	52	2.9
Gas Distribution	8	.4
Market	172	9.6
Port	88	4.9
Sewage Disposal	816	45.3
Street Railway	16	.9
Waterworks	1,294	72.1
No Utilities	274	15.4
Not Reporting	12	....

* Compiled from "The Municipal Year Book 1939."

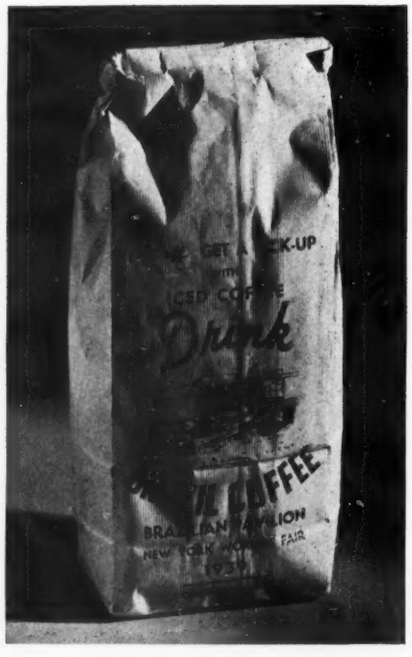
During recent years the dairy industry has come more and more under government supervision and regulations. At present the dairy industry, in certain localities particularly, is but a short step from becoming virtually a public utility. Probably none in the food industries want to relinquish the industry to government control and eventually to government operation. However, the food industries are encouragaing just that trend by inviting government intervention and government regulations as a substitute for salesmanship and business ingenuity in meeting competition.

Flavor Bag Saves Filtering

FLAVORING BAGS are made of vegetable fiber, to hold 5 lb. of spices, seasoning or chopped vegetables. Bags filled with whole spices, or ground spices, onions, peppers, garlic, etc., are suspended in kettles of food to be flavored during the cooking period. The fibrous web of which the bag is made is strong enough to withstand cooking temperatures and at the same time permit the flavoring from the contents of the bag to permeate the cooking foods. The bag is then removed with the contents intact. This oftentime eliminates the necessity of filtering.

They Called It Santos #2

AS THE 1939 WORLD'S FAIR got under way, a line formed at the coffee bar in the Brazilian building. The number of coffee drinkers increased as the Fair passed through summer into fall. Many of the fall patrons were regulars, Fair employees, exhibitors and press men. The coffee bar in the Brazilian building was a "regular" stop on our many visits to the 1939 World's Fair.



This is a 1-lb. package of the coffee served at the Brazilian Pavilion at the New York World's Fair, a coffee enjoyed again and again by regular Fair-goers.

We look forward to it as a high-light in the 1940 Fair.

Never a day at the Fair did we miss a visit to the Brazilian building and a cup of Santos #2. Nor was the coffee the only lure. Watching reactions of those who wandered in and tried Brazil's own idea of coffee was worth a daily visit. Few there were who tasted who did not ask where such coffee could be bought in the states. Most tasters wanted to buy a few pounds to take away with them.

In response to this demand, 1 lb. packages were made available, for those who asked, as long as they lasted at 20c. per lb. The supply was seldom able to meet the demand. During the last days of the Fair many bought in 5 and 10 lb. lots whenever a supply of packaged coffee was on hand.

Apparently, there is an untapped market for coffee in this country, a market at present overlooked. Or, possibly the owners of brands of coffee in this country should teach the nation how to brew good coffee from their brands.

Whichever is the answer, we are one of the many looking forward to the opening of the 1940 Fair to get a cup of Brazilian Santos #2 again.

Way to End Trade Barriers

A RECIPROCAL AGREEMENT between Kentucky, Indiana and Tennessee promises at least a temporary end to one group of trade barriers between these states. Under the agreement privately owned trucks need no longer pay an additional license fee when traveling in one of the other states. Also, trucks for hire, because of a Kentucky-Indiana agreement, may operate tax free in the adjacent state within 10 miles of a point of entry.

This does not end all trade barriers between these states, but it is a forward step. Mutual agreements between all states, not just these states, would be one effective way to dissolve destructive trade barriers.

Stamp Plan Moves Ahead

THE FEDERAL SURPLUS COMMODITIES CORPORATION'S STAMP PLAN, which moved slowly through the experimental stages, is on the threshold of large expansion. It is the expectation of the F.S.C.C. that 25 cities will have the plan by Jan. 1; 75, by July, 1940. Since larger cities are to be included in the expansion, the plan will soon be available to a considerable portion of those on relief. It should then be possible to measure the results more adequately.

New Packages & Products

Food DISTRIBUTION

Two Birds With One Package

Improvements in packaging usually have as an objective one of the following: (1) To effect an economy. This may be brought about by reducing the costs of the many operations required in preparing the modern package for the market. (2) To increase the point of sale value of the package. This is accomplished by increasing the visibility of the product itself, or by increasing the shelf visibility through improved selections of color and design. (3) To furnish greater protection to the product. Preservation is, of course, the basic principle of all packaging. (4) An objective of recent package changes has been to subdivide the contents of a package into convenient portions better suited to consumer requirements.

General Mills, Inc., Minneapolis, in its new package for "Kix", accomplishes two objectives with one package change. Inside the original paper board carton, replacing the original wax paper sack, are three oblong waxed paper board cartons. Each is heat sealed. The contents of two are preserved while the first is consumed. Each of the three inner cartons is nearer a single average family serving than the contents of the original package before dividing into thirds.

The new packages are being introduced in some localities through the aid of a premium, a cream pitcher free with the purchase of two of the new packages.

Now Brides Can Buy Their Gravy

The good old story of the bride who, placing her first order at the butcher's, asked for a steak for two and a nickel's worth of gravy, is now no longer such a sure laugh story. In the Philadelphia area, housewives, young and old, grandmothers as well as newlyweds, can buy a nickel's worth of gravy at the corner grocery store.

"Serv-Agen Instant Gravy," plain, American style; mushroom, European style; and tomato, Italian style; comes packaged in envelopes in a small counter display container. The contents of each envelope makes a serving of gravy for the average meal.

Serv-Agen gravies, products of Serv-Agen Corp., Philadelphia, were first prepared for the institutional trade. They were first introduced to

the retail trade last Lent as meatless gravies. Although containing a large number of ingredients, these prepared gravy mixes contain no substances of animal origin.

New Family of Seafoods

Since quick frozen fish have brought fresh sea fish to the hinterland all the year round, many prepared seafoods have been placed on the market to add to the variety as the total consumption of seafoods increases. Recently, a family of seafoods, "Capeland" bouillebaise, fish chowder, minced sea clams, and Cape Cod style clam chowder have been introduced in the Eastern market. They are the products of The Beacon, Inc., Hyannis, Mass.

Economy Family

In past issues of Food Industries, attention has been called to many food families—those united by a family tie of similar products, or those by the tie of a family package where the family characteristics of the package identified both similar and dissimilar products.

A family of recent origin unites a group of varied products into a family of "snacks" or tid-bits. The family is unique because it is composed almost entirely of 5 cent sellers: popcorn, plain and cheese coated; pretzel sticks; dried and smoked fish; dessicated shrimp; jerked beef; cheese crisps; "Krax"; and "Bacon Krispies". This last product is a crisp tidbit made from bacon rind by extracting the fat.

This family of luncheon snacks or party *hors d'oeuvres* is packaged in transparent polymerized rubber package material which preserves the crispness, and at the same time, withstands the heavy handling of counter displayed products. The "Tavern Brand" family is produced by Federal Foods Corp., Los Angeles.

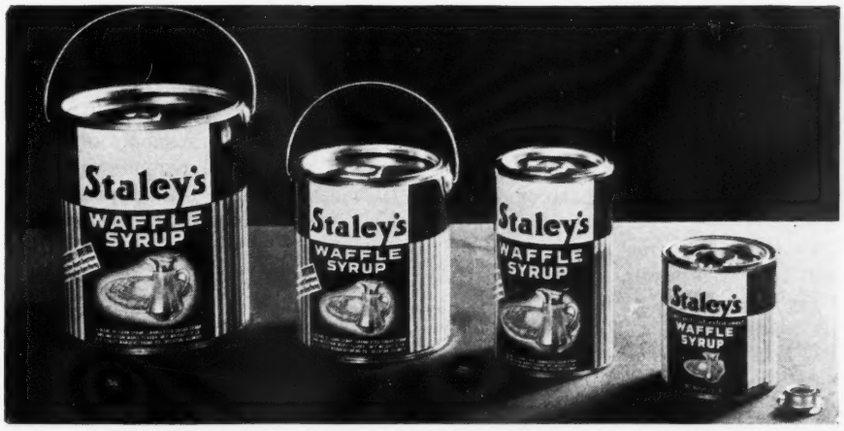
Not Peanuts—B-Nuts

These look like peanuts. They are, however, not peanuts, but a new product made from soya beans from which the oil has been removed to make a non-fattening, crisp, salted, peanut-like tid-bit for cocktail parties, lunches, or anywhere peanuts are munched. "B-Nuts", packaged in transparent cellulose bags, are the first in a series of Vita-Hi food products to be manufactured by Raymond Products Co., Marion, Ohio.

Selected Market Group

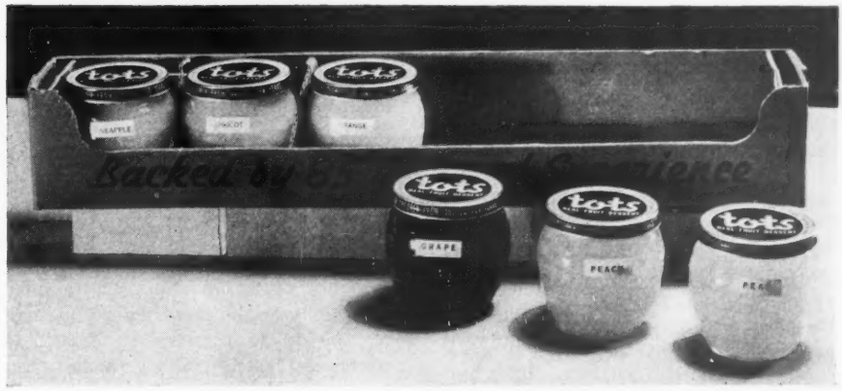
Selected portions of the market are more and more receiving special at-

tention by food manufacturers. Sometimes the division is made on the basis of health and the resulting restricted requirements of diet. Sometimes the special market is selected on the basis of a human frailty—the desire to remain young, beautiful, and slight Often the desire is based on an advertising appeal and may be limited only by the advertising presentation.



The division of the market according to age groups is given more emphasis probably than a market division on any other basis. Strained or homogenized baby foods have a market limited to approximately the first year of the infant's life. Chopped and dried vegetables have been specially set aside to cover the market requirements year round in vegetables for the junior under 10 years of age. Now comes a group of new products specially prepared to meet dessert requirements of the junior special market between the years of one and ten.

These desserts, "Tots", products of P. J. Ritter Co., Bridgeton, N. J., are long cooked tapioca and fruit juices. Six of these products, flavored peach, pear, orange, pineapple, apricot, and grape, come packaged as a unit which may be a display unit or a consumer unit. The unit, containing six jars of fruit and tapioca dessert, is of green corrugated paper board, colorful in appearance, and yet substantial enough to protect the glass containers in the store or at home.



Food DISTRIBUTION

It Takes the Drip out of Sirup

The A. E. Staley Mfg. Co., Decatur, Ill., with the introduction of its new sirup container pouring spout has ended the sticky drip of sirups. Probably no package irritates or riles more housewives than the inevitable sticky mess which results from the use of molasses and sirups in the conventional type of compression top can.

In spite of its disrepute as a messy container for sirups, the compression top can has advantages which cannot be passed over lightly. The containers stack well in shipment or on display. Bails can be attached to the larger sizes, affording them a reuse value of no small consequence when rural sales are in the balance. The new spout introduced by Staley retains all the advantages of the old containers and adds easy, dripless, smearless handling of the contents.

Into the compression lid of the can is pressed a pouring spout. Although the lip of the spout extends over the edge of the can, it does not interfere with stacking. The closure of the spout is a small compression lid with an apron which fits over the spout and seals it. This prevents any dripping or running of sirup down the side of the container in case any sirup remains on the lip of the spout when the spout cap is replaced.

"Staley's Waffle Syrup," featured in these new containers, is a blend of corn sirup, granulated sugar sirup, and imitation maple flavor.

Test New Product at Fair

Sterling Cider Co., Sterling, Mass., delayed placing its new product, "Sterling Sparkling Cider," naturally fermented apple juice, into widespread distribution until the close of this year's New York World's Fair. The product, a champagne-like sparkling beverage, was sold to World's Fair visitors at the Sterling Cider Company's exhibit in the Food North Building, through which building passed millions of consumers interested in foods. The product has had local distribution in Massachusetts.

Drugstore Market Widens

The drugstore is increasing in importance as an outlet for prepared foods. The dry cereal manufacturer and the soup manufacturer have discovered this market. Once, only ice cream manufacturers monopolized the drug store market. Recently, Hirsch Bros. & Co., Louisville, Ky., has placed "Paramount Vegetable Soup" in a 10 cent individual service for restaurants, tea rooms, and drugstores.

Food Technology

NEW DISCOVERIES & INVENTIONS

FOOD TECHNOLOGY

Sterilizing Fish Pickling Brines with U. V.

IRRADIATION with ultra-violet light may prove a convenient method for partially sterilizing brines or pickles used in curing fish. Such liquids can be a serious source of contamination. Factors, such as initial contamination of the fish and its freshness, salt concentration of the brines, etc., in connection with chemical treatments almost certainly influence the effectiveness of irradiation.

Experiments with contaminated brines in a specially constructed sterilizing tank (described and illustrated in detail) showed that treatment with ultra-violet light renders practically all viable bacteria incapable of further growth. Whether or not the use of almost sterile brines improves the keeping quality of fresh or smoked fish fillets is now under investigation.

Treatment with ultra-violet has distinct advantage over heating a brine in order to sterilize it because the bacteria are being killed during the actual brining of the fillets.

Digest from "Ultra-violet Light as a Sterilizing Agent for Brines or Pickles," by O. C. Young, H. L. Tarr and P. A. Sunderland. *Progress Reports of Pacific Biological Station, Nanaimo, B. C., and Pacific Fisheries Experimental Station, Prince Rupert, B. C.* No. 39, 16, 1939.

Pectin From Sweetpotato Pulp

PECTINOUS MATERIAL is widely distributed throughout the vegetable kingdom, being present in almost all plant materials. There are, however, at present, only two commercial sources: apple pomace, the byproduct of cider and vinegar manufacture, and citrus industry byproducts (lemon, orange and grapefruit peel). Attempts have been made to prepare pectin from beet pulp, but pectin from this source apparently has but little jellying power in comparison with either apple or citrus pectin.

The presence of pectin in sweetpotato tubers has doubtless been long known to various investigators, although a survey of the literaturs has disclosed no evidence of this. It may also be remarked that any attempt to extract the approximately 2 per cent of pectin from sweetpotatoes containing about 20 per cent of starch and other constituents which interfere with the extraction of pectin would hardly prove to be a practical commercial proposition.

As a result of the recent development of a sweetpotato starch industry in the United States, a byproduct of this industry — sweetpotato pulp — is now being marketed as a cattle feed and is already available in large quantities at one starch manufacturing plant. During the process of manufacturing starch, most of the pectin is concentrated in the pulp, as this has been found to contain about 15 per cent of pectin. This pulp, therefore, is another promising commercial source of pectin.

In preliminary work, pectin has been extracted from sweetpotato pulp with dilute acids, dilute alkalies and ammonium oxalate. The product thus obtained made a firm jelly with solutions of sugar in the usual manner. Further work is now being conducted to develop an economical method for obtaining pectin from sweetpotato pulp on a larger scale. In addition, the chemical and physical properties of this new pectin are being studied and various possible new uses are being investigated.

By E. Yanovsky.—Carbohydrate Research Division, Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture.

Vinegar Making Under Automatic Control

ECONOMIES of construction obtained in large generators, plus the high yield efficiency of small ones, constitute the advantages of automatic control described in U. S. Patent No. 2,156,428 for gravity flow vinegar making systems. By means of floats, solenoid actuated valves and a clockwork timer, measured quantities of the alcohol-vinegar mix are fed into the generator on predetermined periodic cycles to maintain a regulated flow through the generator counter to a similarly regulated flow of air under thermostatic control. To get and keep a controlled balance between the volume of the mix and the air at different levels, the generator is zoned by chambers to permit installation of feed distributors, air supply inlets, actuating valves and temperature regulators. Lewis S. Elmer, Baltimore, Md., is the patentee.

Wetter Water Aids Plant Cleaning

IN CLEANING, the wetting quality of the detergent solution is its most important function, enabling it to squeeze in between the surface to be cleaned and the film that soils it. When the solution has completely wetted the surface, i.e., formed a film *between* the surface and the soiling layer, then other physical and chemical factors become active in removing the residue. These are penetrating, emulsifying and solvent qualities. If they function properly, the solution will so loosen the soiling film that it may be removed by a thorough rinsing.

For centuries soap was the wetting agent universally employed, but quite recently other wetting agents have become available. Their molecules contain both hydrophobic and hydrophilic groups. The former may be either a straight or branched hydrocarbon chain or chains, and may be an alkyl, aryl, or alkylaryl group. The hydrophilic group is likely to be a $-SO_4H$ (sulphate), $-SO_3H$ (sulphonate), or $-CO_2H$ (carboxylate) radical.

A series of different types of wetting agents was studied, standardized as to wetting times, then tested as to their ability to remove a film of cooked milk, thoroughly dried on tinned copper. If the soiling film was easily rinsed off *without scrubbing,* it was considered a "good" detergent. Of these, 50 per cent classified as "good." Cost per 100 gal. of solutions, having satisfactory wetting times, ranged from $0.31 to $6.05, with eight at less than $1.00 *vs.* $0.09 to $0.16 for common alkali cleaners. Offsetting the higher cost was the much shorter wetting time, usually less than 20 seconds *vs.* longer than 2400 seconds for the alkali cleaners. The author believes the dif-

ference in cost is balanced by the saving in labor and equipment.

Digest from "The Application of Wetter Water to Dairy and Milk Plant Use," by F. M. Scales and Muriel Kemp. Paper read before New York Association of Dairy and Milk Inspectors, Syracuse Meeting, 1939.

BAKERY PRODUCTS

Ascorbic Acid vs. Bromates

POTASSIUM BROMATE increases loaf volume of bread not because it stimulates yeast activity, but because it inhibits the action of proteolytic enzymes. In tests with 40, 60 and 80 parts per million of potassium bromate, volume was increased 11 per cent in loaves and 4 per cent in buns, as compared with untreated flour. Ascorbic acid (vitamin C) is still more effective and, unlike potassium bromate, it has no effect on the viscosity of the proteins and their degradation products, hence does not influence the physical properties of the dough. Tests with only 8 and 16 parts per million of ascorbic acid in flour gave 23.4 per cent volume increase in loaves and 13.6 per cent in buns, as compared with untreated flour. These are maximum laboratory figures, not the increases to be expected in actual production.

Ascorbic acid is definitely more suitable than potassium bromate as a flour improver. It offers the possibility of fortifying flour with an otherwise absent vitamin, but it has not yet been proved by test that the vitamin survives baking. It should be judged strictly on its known merits, without expecting too much from its use in flour.

Digest from "Chemical Treatment of Flours," by Karel Burian, *Chemicky Obzor* 14, 73, 90, 1939 (Published in Poland).

DAIRY PRODUCTS

Wrapped Butter Deterioration

AIR is harmful to butter because atmospheric oxygen reacts with the most easily oxidizable components to form peroxides, thus leading to spoilage. Light is harmful because it greatly accelerates the oxidation. In the spectrum of sunlight, the most active wave lengths for intensifying oxidation are at the orange and red end. At the blue and violet end of the visible spectrum, and in the ultraviolet rays beyond the visible range, there is still some activity but less than with orange and red light. A green filter, screening out the most harmful rays, gives some protection; but the most effective protection from light is aluminum foil lined with parchment paper, or red parchment paper. Butter and wrapper should make close contact.

If butter remains long wrapped in aluminum foil, even a fully lined foil, it gradually acquires a metallic taste. Spoilage by oxidation can be greatly retarded by making the butter in an atmosphere of nitrogen. Storage in an atmosphere of nitrogen or hydrogen will prevent oxidation but is undesirably favorable to the growth of certain microorganisms. Heavy metals have only a slight influence on peroxide formation, none if the metal is present only in traces. The color of butter is sometimes impaired by loss of water at the surface, due to phase separation in the butter fat emulsion. The color change penetrates only to the depth affected by phase separation.

Digest from "Studies of Deterioration in Wrapped Butter," by E. Erbacher and W. Schoppmeyer, *Deutsche Molkerei-Zeitung* 60, 468, 504, 536, 609, 1939 (Published in Germany).

Skim Milk for Coffee in Germany

MILK PREPARATIONS which are entirely satisfactory for use in coffee, though less attractive for direct consumption, are made from skim milk powder or condensed skim milk. Whole milk, with powder from skim milk added, is sometimes used. A special heat treatment is followed by homogenizing. The products are fully acceptable substitutes for coffee cream. In keeping quality, they are entirely satisfactory. These milk preparations can be sterilized, but the treatment involves some loss of tinting capacity in coffee. Viewed simply as substitutes for coffee cream, the preparations are considered superior to fresh skim milk or to cream which has not been homogenized.

Digest from "Low Fat, High Protein Milk Products as Substitutes for Coffee Cream," by W. Mohr and E. Schrimpl, *Molkerei-Zeitung* 53, 813, 1939 (Published in Germany).

BEVERAGES

How to Produce Good Syphon Waters

MAINTENANCE of uniform optimum pressure within the syphon bottle is the best safeguard against the two most frequent complaints, namely: (1) water that is not "sharp" enough, and (2) bottles that do not empty properly. Optimum pressure is based on a proper relation of CO_2 content, temperature and capacity of the bottle. Only moderate internal pressure is necessary to avoid gas waste. To obtain uniform internal pressure, a water supply of uniform temperature is indispensable. Storage temperatures below the bottling temperature reduce internal pressure, while higher storage temperatures increase it. The larger the bottle, the higher must be the optimum pressure, amounting to about ½ volume for each additional 10 ounces; 5.3 and 5.8 volumes are ideal CO_2 contents for 30 and 40 oz. bottles respectively.

The requisite cylinder pressure is best determined by experiment under individual plant conditions. A periodic check by regular testing of the final pressure is recommended. Good quality syphon waters are obtained with less difficulty in small bottles. The filling level should be carefully predetermined and all syphons should be filled to the same level, the head space amounting to approximately 4 per cent of the total capacity.

Air encourages the development of aerobic bacteria, gives rise to foaming and agitation, and consequent CO_2 losses, 1 per cent of air lowering carbonation by ½ volume. Serious as the presence of air in the bottling water may be, it cannot be compared with the displacement resulting from air sucked into the system by pumps, faulty connections, cracked pipes, etc. An air-contaminated syphon is readily recognized by the excessive foaming when pouring the first glasses. Difficulties in discharging the entire contents distinguish this fault from excess filling pressure. High pressure syphons continue to foam, but empty completely. High air content reduces the final pressure compared with the cylinder pressure and gives the water a milky appearance when shaken.

Recording pressure gages in place of faulty indicating gages help maintain uniform pressures throughout the plant. Other factors, deserving more attention are: the better mixing of gas and water by greater agitation, followed by longer rest periods; freedom from foreign matters; quiet transportation through pipe lines; and unfluctuating pressure within the cylinder. Syphon waters should be stored at low, even temperatures, and customers should be educated to this effect. A routine system of inspection prevents the use of faulty syphons. Carbonators located as near the fillers as possible, and pipe lines with generous diameter increase efficiency both in cold and hot weather. The actual cylinder pressure should be based on determination of CO_2 content in the syphons.

Digest from "Syphon Water Production" by G. B. Beattie, *Bottling* 59, 28, 1939 (Published in England).

(*Turn to page* 728)

Formulas for Foods

FORMULA NO. 22

General Directions for Sausage Manufacture

1. Use only fresh meat whether it is cured before grinding and chopping, or the quick cure (Formula No. 23) method is used.

2. See that knives and plates fit properly and knives in silent cutter are sharp and set as close as possible to the bowl.

3. Use of mixer is not necessary for sausage and loaves when all ingredients are fine cut in silent cutter. Mixing can be done during chopping operations.

4. Pack all sausage meat as tightly as possible in stuffer. The stuffing cylinder must not leak air. Air pockets do not belong in sausage; they are unsightly and may cause water, jelly, or fat pockets, and detract from the appearance of the finished product.

5. Sausage must be fairly dry when placed in the smokehouse. Wet sausage will not take on a uniform color and will develop a streaky appearance. Care must be taken not to have too high a temperature. This will cause unnecessary shrinkage. Cooking temperature should be at 160 deg. F. for practically all types of sausages. Thermometers should be checked regularly.

6. Immerse or shower all smoked and cooked sausage with cold water. Enough heat should be present in the sausage after cooling to dry it thoroughly.

7. Smoked and cooked sausage should not be stored at excessively low temperatures. Coolers should be maintained at about 50 to 55 deg. F.

FORMULA NO. 23

Quick Cure for Sausage

Sodium nitrate	**3 lb. 2 oz.**
Nitrite of soda	**10 oz.**
Dextrose (corn sugar)	**11 lb. 4 oz.**

Dissolve the above ingredients in 5 gal. of water. Use 1 qt. of this mixture to 100 lb. of sausage material.

FORMULA NO. 24

Stock Fondant

	Test Batch	Production Batch
Sugar	**3 lb.**	**75 lb.**
Water	**1½ pt.**	**3 gal.**
Corn sirup	**1 lb.**	**25 lb.**

Method

Put sugar and water in kettle and bring to boil. Wash down sides of kettle with cold water. Cook to 235 deg. F., then add the corn sirup.

As the corn syrup is added, stir the batch. Cook to 242 deg. F., pour on cooling slab or "cream" beater and cool to 70–85 deg. F. After batch has cooled to proper temperature, it is "creamed" by hand or by machine.

The cooling slab or cream beater should be cold or have circulating cold water. Before batch is poured, the cream beater should be sprinkled with cold water.

FORMULA NO. 25

Butterscotch Sauce

Water	**6 gal.**
Corn sirup	**10 lb.**
Corn starch	**10 lb.**
Sweet butter	**10 lb.**
Vinegar (45 grain distilled or cider)	**3 qts.**
Sugar (sucrose)	**200 lb.**
Sugar color	**2 oz.**

Heat to 234 deg. F. Cool somewhat. Homogenize at 2,000 lb. pressure.

Production = 40 gal.

Directions

Put the cold water into a kettle, then add the corn starch with constant stirring. Then turn on the heat, add the corn sirup, sugar, vinegar and sugar color. As soon as boiling begins, add the butter and boil until the temperature reaches 234 deg. F.

Formula from David Algie

FORMULA NO. 26

Prepared Pancake Flour (Blend Type)

Flour blend [1]	**100 lb.**
Soda (sodium bicarbonate)	**2 lb.**
Mono-calcium phosphate	**2½ lb.**
Flour salt	**2 to 2½ lb.**
Dextrose (corn sugar)	**3½ lb.**
Dry milk solids	**3½ lb.**

[1] Flour may be a wheat flour blend, a buckwheat blend, a cornmeal blend or a wheat, corn, rye and rice mixture.

Mix flour and soda for 2 or 3 minutes before adding remainder of ingredients. Continue mixing to make total time of 20 minutes. Horizontal ribbon type mixer is generally used.

Formula from Dry Milk Institute

FORMULA NO. 27

Medium Rich Basic Sweet Dough

Sugar	**10 to 12½ lb.**
Salt	**13 to 20 oz.**
Malt extract	**2½ lb.**
Shortening	**11¼ to 15 lb.**
Mace	**0 to 2½ oz.**
Eggs	**7½ lb.**
Lemon gratings	**10 lemons**
Water	**41 lb.**
Dry milk solids	**5 lb.**
Bread flour	**65 lb.**
Cake flour	**20 lb.**
Yeast	**5 lb.**

Cream together the sugar, salt, malt extract, shortening and mace.

Add eggs and lemon gratings and cream until light.

Pour in about three quarters of the water, the rest of water to be used for yeast suspension.

Sift the dry milk solids with the bread flour and add to contents of mixer.

Add yeast suspended in remainder of water. Finally add cake flour and mix until dough is smooth and free from lumps. Dough should be set at 76 deg. F. in hot and 80 deg. F. in cold weather.

When butter is used as shortening

(Turn to page 730)

Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Magnetic Separator

STEARNS MAGNETIC MFG. Co., Milwaukee, Wis., has redesigned its Type DH drum type magnetic separator so that it can now be applied to both wet and dry operations. The vibrating feeder provides for dry operation uniform flow and accurate control of material. In wet operation, material is fed by an underfeed. This separator can be obtained in a multiple drum arrangement, for extraction of the most feebly magnetic particles by successive passage through several magnetic zones.

Locker Plant Freezing Unit

BAKER ICE MACHINE Co., Omaha, Neb., has developed a forced draft refrigerating unit for use in the freezing room of frozen food locker plants. This freezing unit has freezing tunnels, within which trays of fruit and vegetables are placed for rapid freezing by air blast. At the same time, the unit maintains sub-zero temperature in the atmosphere of the room in which it is installed. Consequently, meat hung there may be frozen at the same time that fruit and vegetables are frozen in the tunnel.

Large Air Conditioning Refrigeration Machine

FOR INDUSTRIES requiring a large tonnage of refrigeration in air conditioning operations, a compact 100-ton, hermetically sealed refrigeration compressor has been developed by Westinghouse Electric & Mfg. Co., Springfield, Mass. It is said that for equal capacity, this new 16-cylinder V-type 1,150 r.p.m. unit is smaller, lighter and more efficient than previous commercial compressors.

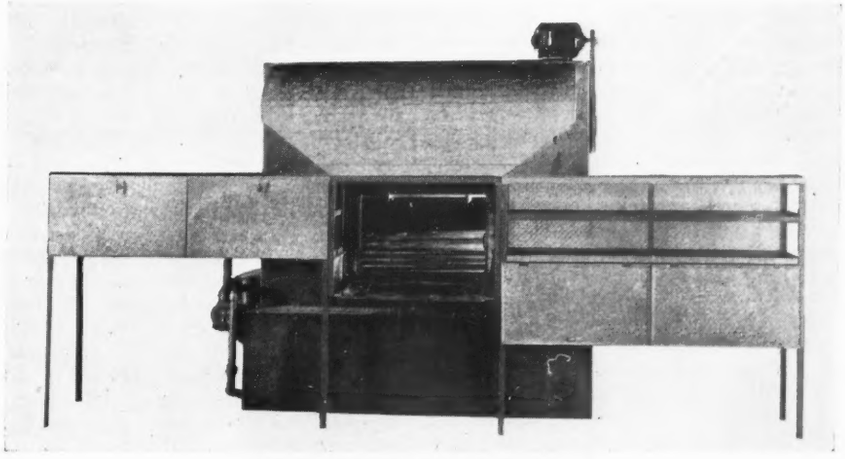
The unit is equipped with a refrigerant cooled motor requiring no external ventilation. Maintenance expense is said to be reduced by the hermetically sealed design in which leaks are avoided. Although of sealed design, servicing is said to be simple, because the entire operating mechanism can be exposed by the removal of the machine's side plates. In doing this, no pipes need be disconnected.

This new refrigeration compressor is available for use on two or three phase, 60 cycle circuits of 208, 220, or 440 volts. The weight of the device is 4,200 lb. and the overall dimensions are 90 in. long, 34 in. wide and 36 in. high. The nominal rating is 1,212,000 B.t.u. per hour, based on 37 lb. per sq.in. gage suction pressure, 65 deg. F. suction gas temperature, 75 deg. F. water in and 95 deg. F. water out.

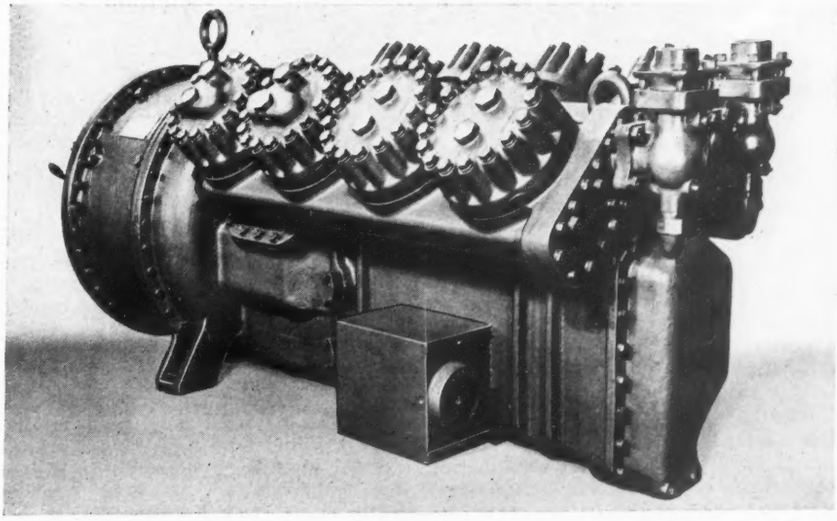
Air Heater

EMBODYING a new type of gas-fired burner, the Selas Co., 18th St. and Indiana Ave., Philadelphia, Pa., has brought out a new line of air heaters suitable for use with drying equipment and similar applications. The new burner is said to operate with high efficiency and safety and to require but small space. Incoming air is made to approach the heat source

(*Turn to page 722*)



Freezing unit for locker plants.



Hermetically sealed V-type 16 cylinder, 100-ton refrigeration compressor designed for air conditioning work.

The Food Industry News

GENERAL NEWS, BUSINESS TRENDS, MEN, JOBS AND COMPANIES • DECEMBER, 1939

Facts about Distribution Problems Reported to Grocery Manufacturers

Enlightening facts relating to problems of food distribution were told to manufacturers attending the annual convention of Associated Grocery Manufacturers of America, in New York, Oct. 31 to Nov. 1. Outstanding in this respect was the talk by A. C. Nielsen, president, A. C. Nielsen Co., entitled "New Facts on Food Marketing." He related the operation and accomplishments of the Nielsen recorder, a new instrument which is attached to a radio receiving set to record every turning of the dial and the exact amount of time the radio is tuned to any program; a month of the radio's operation is recorded on one chart. Two hundred of the instruments have been in operation for about a year, and the studies made so far show clearly that the range of sales results from various radio programs is exceedingly wide, that much of the present information about radio is incorrect and that there are many as yet unexplored opportunities to learn more about radio and hence make it pay greater dividends, Mr. Nielsen reported. It will pay to get more facts on radio, he advised the manufacturers.

Speaking of the value of research in solving marketing problems, Mr. Nielsen said that one study revealed that the average executives are right, or substantially right, in 58 per cent of their decisions on important marketing questions. After a long talk in which he presented many sets of facts discovered by research, Mr. Nielsen drew from those facts these conclusions as to what the food manufacturers should do:

Adapt policies and packaging to the conditions created by super markets; they continue to grow rapidly. Be more open-minded toward the quality and consumer appeal of a competitor's product, since the final answer as to its value comes from the consumer. That display tests, for the advertisers' purposes, should not be used unless the sales trends are checked in non-display stores as well as display stores. Competitors in some divisions of the food industries should cooperate in what might be termed a "combination in restraint of uneconomic advertising." Some means should be developed to reduce sales caused by retail out-of-stock conditions. Increase product research, as "following" seldom leads to the success attained by pioneering. Do not scoff at a low-priced competitor or asume he is losing money and will soon go out of business; quite a few of these fellows have been given free rein until they have dominated a business. Premiums often work successfully in spite of an avalanch of trade resistance. Generally speaking, consumer incentives are more profitable than trade incentives. Small-town and rural markets merit more attention. And there is a tremendously fruitful field for study in the pricing of advertised brands in relation to private brands; consumer sales are extremely sensitive to changes of only a fraction of a cent in average price differentials; and for each product there is one certain price differential that yields maximum dollar profit to the advertiser.

Some insights as to just how far the consumer movement has penetrated were reported by Dr. Geo. Gallup, Director, American Institute of Public Opinion. People were asked how much of the fifteen cents paid for a nationally advertised brand of breakfast food went for advertising. The median answer was four cents. A rather general acceptance of the facts in *Consumers' Research* and such publications was discovered, especially among teachers, while the book "One Hundred Million Guinea Pigs," stood in about sixth position as the most interesting book that people have ever read in their lives. Two people out of every three think that there is too great a difference between the cost of manufacturing a product and the price you have to pay for it in the store. There is much interest in grade labeling, though not a lot of people know what it is all about. And people are all for standardization, because it sounds like something good. Forty-five per cent of the people and 61 per cent of the teachers favor the creation of a government department for consumers.

Food manufacturers were advised to do more product research by Dr. Gallup, who reported that many products had suffered a decline in sales immediately upon being discussed in consumers publications. He said, too, that the time has come to give more thought to greater efficiency in distribution and selling, and he advocated more research into the buying habits, tastes and the like of consumers.

A vigorous campaign of truth telling about itself by American industry to counteract the attitude of skepticism which has been allowed to grow in the minds of women consumers was urged by two women speakers at the AGMA

RE-ELECTED BY AGMA

Paul S. Willis again was named president of Associated Grocery Manufacturers of America at the convention held last month.

HONORED BY AGMA

Dr. Mary Swartz Rose received the annual award of Associated Grocery Manufacturers of America in recognition of her outstanding contributions to the field of nutrition. As professor of nutrition at Teachers College, Columbia University, New York, she teaches teachers of nutrition.

convention. The speakers were Dr. Lena Madesin Phillips, president, International Federation of Business and Professional Women, and Miss Mable Flanley, eastern director of consumer relations, the Borden Co., New York.

Analysis of the results of the government's food stamp plan in six cities where it has been in operation shows that were the plan to be put on a national scale and the same preferences shown, 13 per cent more butter, eggs, and corn meal, 5 per cent more flour, 20 per cent more rice, 25 per cent more dried beans, and 38 per cent more prunes would have to be produced in the United States to meet the demand, according to Milo Perkins, president, Federal Surplus Commodities Corp.

Net profit gains of 10 to 20 per cent for the July-September quarter of this year as against the same period last year were reported by the manufacturers in a survey disclosed by Paul S. Willis, president of AGMA. And most of the manufacturers anticipated a larger volume for the final quarter than for the same period of 1938.

Sugar Industry Exempt From Maximum-hour Law

Exemption from the maximum hours provisions of Sec. 7 (b) (3) of the Fair Labor Standards Act of 1938 has been granted to that portion of the cane sugar processing and milling branch of the cane sugar industry located in Louisiana. This exemption was granted on Nov. 16 by Harold D. Jacobs, acting administrator of the wage and hour division of the Department of Labor.

The ruling applies to the unloading of sugarcane from wagons and railroad cars onto conveyors; the processing of the cane into sugar, sirup and molasses, but not the refining of these products; the removal, handling and conveying of raw sugar, sirup and molasses to storage and placing them in storage in the vicinity of the sugar mill; and the removal, conveying, burning, bailing and piling, and storing in baled form, in the vicinity of the mill, of bagasse resulting from processing the sugarcane.

This action was based upon evidence indicating that the industry is of a seasonal nature. That is, the sugarcane must be harvested regularly during a certain season, is processed in a regularly recurring season, and the mills wherein the processing occurs do not engage in other operations at the end of the operating season.

British Buyer Named

Purchases for the British government will be made in this country by the British Supply Board, which may be reached at 25 Broadway, New York, N. Y., it was announced last month in a release issued by the British consulate. While no restrictions to the effect have been issued, it probably would be advisable for manufacturers to communicate with the agency in writing.

Outlook Unpromising For Foreign Food Sales

There apparently will be no war boom in foreign food purchases from the United States. Allied government purchases of food and foodstuffs are to be confined largely to the colonies, especially those countries which accept the pound sterling at par.

British purchases will continue to come from the traditional sources, that is, from Canada, Australia, New Zealand and South America. Foods to be bought outside this area are only those which are not otherwise available at the present time.

France expects to purchase some foods from the United States, but these will be bought for export to French colonies that normally depend on France for their supplies.

Canadian food manufacturers, especially those United States firms with Canadian branches, are having considerable difficulty with their exports because it is necessary to have proper British authorization to ship to the United Kingdom for any purpose. The manufacturers are not able to get such authorization for many processed foods, such as catsup and pork and beans. Fruit juices, on the other hand, are freely authorized.

Russia seems likely to be a minor factor as a source of food for Germany as a result of the extremely slow methods and the dilatory tactics of the Russians. Red tape still abounds and apparently the urgency of need has little effect in speeding things up.

This picture of foreign trade during the war will, of course, change with time. But the outlook for United States food exports to the United Kingdom seems very unpromising.

Neutrality Act Affects Sales of Food Abroad

The cash and carry neutrality plan established by Congress means that any important food markets of the world are open to the United States manufacturers. But various factors will interfere with sales of any foods that foreign groups wish to buy. One is the ability of the buyer to pay cash if he happens to be a belligerent. Another

CAPITAL VIEWS

LABEL DECEPTION— Recent decisions of the Federal Trade Commission on food labels show how that agency can both discipline and protect food manufacturers. A firm closely imitating Lea & Perrins, Inc., Worcestershire sauce was ordered to cease and desist numerous practices which amounted to imitation of the older widerknown product. Thus the prestige value of label and dressing of a package is protected against unwarranted simulation.

But FTC also insists that labels must not imply propaganda features unwarrantedly. On this ground it has ordered various salt manufacturers to stop using the word "smoke" or any words similarly implying flavor characteristics "unless the salt so described or designated has been or is directly subjected to the action and effect of the smoke from burning wood during its process of combustion sufficiently to acquire from such source alone all of its smoke or smoke effects for use in curing, preserving, smoking, or flavoring meats." This last case is most interesting because it represents final action on a prosecution initiated formally nearly six years ago.

WAGE RULINGS CONTINUED— Secretary of Labor Perkins declines to be discouraged in minimum-wage fixing by the recent Appeals Court ruling that upset an earlier decision on steel wages. That ruling seems to forbid blanket requirements as to minimum wages for manufacturers supplying goods to the government. But additional minimums are being fixed for other industries which will govern companies that wish to do business with Uncle Sam under the Walsh-Healey Law. Thus far, few food companies have been so restricted. Food plant wages are, therefore, limited primarily by the wage-hour rulings under the Fair Labor Standards Act, which govern compensation regardless of who is the buyer of the goods.

RAILS AND TRUCKS—The Department of Justice thinks that the railroads are violating the antitrust laws by refusing to make joint rates with motor transportation firms for goods and passenger traffic. They regard it as a violation of Federal law that the railroads will not play ball with another type of carrier. They intend to force cooperation and thus prevent the railways from stifling sound development of highway traffic. This may help the food industry materially where joint rates are essential for economic haul of either raw materials or finished food products. It is likely to restrict the competition of the rails with the highways to the long-time benefit of the shipper. The Department of Justice hopes for such result.

FOOD TARIFFS — Negotiations continue aggressively between the State Department and several Latin American countries looking to further tariff changes under the trade agreement program. Cuts in several vegetable oil and fat tariffs are being considered by the State Department. Agricultural leaders are indignant. The State Department is plowing ahead nevertheless, hoping to get several new agreements into force before the present law lapses on June 12. Most folks now think that Congress will not extend this authority, as too many "sacred cows" have been bothered by the State Department. Numerous State delegations are solid against the trade agreements program.

is whether ships will be available to carry the food to its destination.

Belligerents must pay cash to meet the law. Neutrals had better be expected to pay cash to protect the seller. International trade settlements are so very difficult these days that any exporters of food will take a long chance if they take on business with new foreign customers on a credit basis. This fact is actually worrying Washington quite a lot, since it is the bottleneck limiting outgo of many goods of which we have surpluses.

There will be plenty of shipping under the United States flag to move manufactured foods into territories of the world where American ship movements are not restricted. Thus this factor is not serious except for Western Europe. All shipments to belligerents must be made in foreign vessels, either belligerent or neutral. And another complication in regard to shipping is that American vessels may not pass through "combat areas" established by the President, even though destined for neutral ports.

Yet another restriction that the industry must observe under the neutrality law is that any articles or materials can not be exported to any belligerent until the title is transferred to a foreign government, corporation or person, this transfer being effected before the vessel leaves this country. Companies doing business with Canada should bear in mind that shipments to Canadian ports on the Atlantic must meet all the restrictions of the neutrality act, while inland or Pacific Ocean shipments do not.

ADDITION TO CHICAGO'S SKYLINE

The new building of Kraft-Phenix Cheese Corp. as it appears at night. To capitalize upon the advertising value of the building, night illumination has been provided by three projector units. The two in the picture each have 27 one-thousand-watt wide-angle projectors. The third unit, which lights the center of the structure and the tower, is 100 ft. away and has 15 focusing projectors. The building faces the Outer Drive.

Bottlers Get Pointers At Big Convention

More than 7,000 attended the convention of the American Bottlers of Carbonated Beverages held in San Francisco Oct. 30-Nov. 3. And more than $1,000,000 worth of equipment was sold at the exposition held concurrently with the convention.

Prof. W. V. Cruess, of the University of California, advised the bottlers attending the meeting to make greater use of fruit juices which are inexpensive and of high dietary value. Most present-day carbonated beverages containing fruit juice have a 10 per cent fruit content, but beverages of 25 to 30 per cent fruit content would have a greater appeal, he said. A prune beverage would have a particular appeal in this age of speed in the opinion of Professor Cruess.

Practical information for the plant man in the carbonated beverage and other industries was contained in the talk of W. R. Junk, technical department, California and Hawaiian Sugar Refining Corp. Speaking on the storage and handling of sugar in bottling plants, Mr. Junk said that granulated sugar should be stored in a dry, well ventilated location to prevent undesirable lumping or caking, and the bags should be stored on racks, to facilitate handling and prevent absorption of moisture from the floors. Tarpaulin should be used to cover sugar to protect it from dust contamination or water damage. A relative humidity below 60 per cent should be maintained in a sugar storage room to prevent caking. In the preparation and distribution of sugar syrups, special care should be taken to prevent dust and lint contamination from the bags, and under all conditions filters should be employed to remove any insoluble material which may have entered the syrup.

A new problem faced by bottlers is the testing of soaker solutions in which bottles having aluminum labels or foils are washed, according to C. A. Shillinglaw, ABCB research fellow, and Max Levine. When a solution of caustic soda, or sodium hydroxide, comes in contact with the aluminum on the labels, the aluminum goes into the solution, combining with the caustic soda. When this takes place, hydrogen is liberated and the caustic soda and aluminum form a new, milder alkali, known as sodium aluminate. Tests indicated that while it took 43 minutes for an original 2 per cent caustic solution to kill *Bacillus metiens* spores at 122 deg. F., it required 80 minutes for the solution in which 0.75 per cent caustic has been transformed into sodium aluminate. That is, the killing time is almost twice as long.

At the close of the meeting the bottlers re-elected Paul F. Glaser, Seattle, president; Edward Wagner, Cincinnati, vice-president; Joseph La Pides, Baltimore, treasurer; and John J. Riley, Washington, secretary.

FTC Finds Milk Monopoly

Monopolistic practices are laid to National Dairy Products Corp. and Borden Co. in the Federal Trade Commission's report entitled "Concentration of Control Over Sale and Distribution of Milk and Dairy Products." The report has been made part of the records of the Temporary National Economic Committee.

It is charged that through acquisitions of established milk and milk product concerns—National Dairy with a total of 360 which have been consolidated into 96 operating subsidiaries—the two organizations approach close to monopoly in some of the main milk markets in the United States.

6,000 Attend Dairy Show and Conventions

Some six thousand delegates from all parts of the United States and from Canada, Central and South America, Europe, Australia, New Zealand and the Orient attended the Dairy Industries Exposition held in San Francisco, Oct. 23-28, concurrently with the conventions of International Association of Ice Cream Manufacturers (Food Industries, November, page 645) and the International Association of Milk Dealers. One hundred and fifty dairy machinery and equipment firms and educational and industrial institutions participated in the exposition, which was reported to be one of the most successful ever held.

How the dairy industry can increase milk sales and improve its relations

with the public was told by John Marshall, Jr., secretary of the San Francisco Milk Dealers Association, who spoke at the milk dealers convention. He described San Francisco's cooperative milk campaign, which apparently increased milk sales in the city by 15 per cent. In this campaign, newspaper advertisements, demonstrating the health reasons why adults and children alike should drink more milk, were coupled with editorial publicity afforded by the press.

CONVENTIONS

December

4– 9—Exposition of Chemical Industries, Grand Central Palace, New York.
5– 6—American Butter Institute, Palmer House, Chicago.
5– 7—Southern Association of Ice Cream Manufacturers, Peabody Hotel, Memphis.
7– 8—Tri-State Packers Association, Atlantic City, N. J.
10–12—New England Bakers Association, fall convention, Hotel Statler, Boston.
28–30—Society of American Bacteriologists, Hotel Taft, New Haven, Conn.

January

3– 5—Northwest Canners Association, Washington Hotel, Seattle, Wash.
8–10—Eastern Soda Water Bottlers' Association, Hotel Kimball, Springfield, Mass.
17–18—New England Association of Ice Cream Manufacturers, Copley Plaza Hotel, Boston, Mass.
17–19—American Society of Refrigerating Engineers, Blackstone Hotel, Chicago.
20–21—National Food Brokers Association, Palmer House, Chicago.
21 (week of)—National Canners Association and Canning Machinery and Supplies Association, Stevens Hotel, Chicago.
21–23—Potomac States Bakers Association, Lord Baltimore Hotel, Baltimore.

The next Dairy Industries Exposition and the 1940 annual conventions of International Association of Ice Cream Manufacturers and International Association of Milk Dealers will be held in Atlantic City, N. J., the week of Oct. 21-26, 1940.

Changes Mind on Dextrose

Neither sugar (sucrose) nor dextrose need be declared on the canned pea labels, it is recommended by John McDill Fox, in his report and proposed findings of fact on the canned pea identity standard hearing. This attitude has attracted the close attention of both sides in the sucrose-dextrose controversy. And considerable surprise is expressed in some quarters at the sharp divergence between the proposals in this report and those contained in the report on canned fruit. In the latter, also filed by Mr. Fox, it was urged that the label requirements provide for declaration of all sweetening ingredients, including even a differentiation of cane and beet sugars. It is taken in Washington that the report on peas indicates Mr. Fox has no particular position to defend or maintain regarding declaration of sweetening ingredients, and is willing to listen to "reason" regarding such declarations.

Ice Cream Definitions Proposed at Hearing

A novel procedure was followed by the Food Standards Committee in the first step of preparation of a standard of identity for ice cream at the open session of the committee, Nov. 16, in Washington. At that session spokesmen representing ice cream makers, ice cream materials, and the general public all appeared to suggest the ways in which the Food and Drug Administration should draft a statement as to the commodities which might properly be called "ice cream" under the food and drug law.

Major presentation was made on behalf of the industry by the International Association of Ice Cream Manufacturers. The vital recommendations dealt with ice cream mix and ice cream in the following language:

"'Ice Cream Mix' means the pure, clean product made from a combination of milk products and sugar and may contain one or more of the following ingredients: eggs, egg products, harmless coloring, table salt, stabilizer. It may not contain more than one-half of one percentum by weight of stabilizer. It may not contain less than 10 percentum by weight of milk fat nor less than 18 percentum by weight of total milk solids. The acidity and/or the salt balance of ice cream mix may be standardized by the use of a harmless alkali in an amount not to exceed .1% calculated as lactic acid.

"'Ice Cream' means the pure, clean, frozen product made from ice cream mix and harmless flavoring. It contains not less than ten percentum by weight of milk fat, and not less than eighteen percentum by weight of total milk solids; except when fruit and fruit juices, nuts, cocoa or chocolate, or cocoa or chocolate sirup, maple sirup, cakes or confections are used for the purpose of flavoring, then it shall contain not less than ten percentum by weight of milk fat and not less than eighteen percentum by weight of total milk solids, except for such reduction in milk fat and in total milk solids as is due to the addition of such flavoring, but in no such case shall it contain less than eight percentum by weight of milk fat nor less than fourteen percentum by weight of total milk solids. In no case shall any ice cream contain less than one and six-tenths pounds of total food solids per gallon."

The Food Standards Committee was much impressed by the general character of the definition and appeared disposed to accept the major arguments.

Schedule of Action on Food Standards *

	Docket number and commodity	Type of standard or regulations	Presiding officer	A: First announced in Fed. Register	B: Initial hearing date	C: Preliminary briefs due not later than	D: Examiner's findings published in Fed. Register	E: Secretary's order published in Fed. Register	F: Effective date of order
5-I	Canned peaches	Identity, quality, fill	J. M. Fox	Mar. 7, '39	April 10, '39	June 26, '39[3]	Sept. 7, '39[7]		
5-II	Canned apricots			Mar. 7, '39	April 10, '39	June 26, '39[3]	Oct. 5, '39[8]		
5-III	Canned pears			Mar. 7, '39	April 10, '39	June 26, '39[3]	Sept. 19, '39[8]		
5-IV	Canned cherries			Mar. 7, '39	April 10, '39	June 26, '39[3]	Oct. 11, '39[8]		
6	Canned peas	Identity, quality, fill	J. M. Fox	Mar. 7, '39	April 17, '39	June 29, 39[3]	Nov. 9, '39[8]		
7-A	Cream	Identity	F. S. Hassell	Mar. 28, '39	May 1, '39	July 27, '39[3]	Sept. 26, '39		
7-B	Whipping cream			Mar. 28, '39	May 1, '39	July 27, '39[3]	Sept. 26, '39		
7-C	Evaporated milk			Mar. 28, '39	May 1, '39	July 27, '39[3]			
7-D	Sweetened condensed milk			Mar. 28, '39	May 1, '39	July 27, '39[3]			
7-E	Dried skim milk			Mar. 28, '39	May 1, '39	July 27, '39[3]			
8	Canned vegetables	Identity	F. S. Hassell	Mar. 24, '39	April 24, '39	June 19, '39[3]	Aug. 15, '39		
9	Coal-tar colors [4]	Legislation and certification	F. S. Hassell	June 3, '39	July 5, '39	July 20, '39	Aug. 16, '39	Sept. 16, '39[9]	Sept. 16, '39[2]
10-A	Fruit jams	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39				
10-B	Fruit jellies	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39				
10-C	Fruit butters	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39				
11-A	Cheddar cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Sept. 25, '39				
11-B	Washed curd cheese			Aug. 22, '39	Sept. 25, '39				
11-C	Colby cheese			Aug. 22, '39	Sept. 25, '39				
12	Cream cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Oct. 2, '39				
13	Coal-tar colors [4]	Listing and certification	F. S. Hassell	Oct. 20, '39	Nov. 20, '39				

[1] Typographical errors corrected in *Fed. Register*, June 3, '39.
[2] Emergency declared to exist, order effective on publication.
[3] Time extended from earlier date previously announced.
[4] Amending order of Docket 4.
[5] See also Dockets 9 and 13.
[6] No definition or standard ordered for eggs: definition included for each egg product.
[7] Standard of identity only; standard of quality and standard of fill of container published in *Federal Register* on Sept. 15, '39.
[8] Standard of identity only; standards of quality and fill of container published in *Federal Register*, Oct. 24, '39.
[9] Typographical errors corrected in *Federal Register*, Oct. 20, '39.
[10] Standards of identity only.
* Dockets 1 to 4, pertaining to tomato products, canned tomatoes, eggs and egg products, are completed and have been dropped from this table. See FOOD INDUSTRIES, October, page 569 for this data.

Names 7 More Cities For Food Stamp Plan

Seven more cities recently have been designated as areas for application of the Federal food stamp plan, now in operation in eleven territories. The additional cities, in which the plan is expected to be put into effect soon, are St. Paul; Minneapolis; Providence; Bismark and Manden, N. D.; Denver; and Sioux Falls, S. D. Other cities are under consideration, among these being Richmond, Va., and Hartford, Conn. Thirty cities are expected to be under the plan by Jan. 1 and 100 cities by July 1. In Rochester, where the plan was started, the average weekly distribution under it amounts to $20,000 worth of foods.

The new phase of the plan whereby it is applied to low-income groups in addition to people on relief is still in the stage of an experiment, and it is expected that a six months' trial at Shawnee, Okla., may be necessary before this phase is perfected.

Not Freed by Guaranty

Attachment of a manufacturer's guaranty, warranting the fitness of a packaged food product, relieves the retailer from criminal liability under a Montana statute, but not from civil liability, the Montana Supreme Court has ruled in Bolitho, et al. v. Safeway Stores, Inc.

Vitamins Are Food

Vitamin A-B-D-G capsules are accesory food factors, not drugs, and therefore can be sold by grocers, a Superior Court judge of Marion County, Indiana, has decided in overruling a regulation of the Indiana Board of Pharmacy which restricted the sale of vitamin preparations to drug stores. Kroger Grocery & Baking Co. brought the action.

High Court Takes Milk Case

Apparently the moot question of whether the Sherman Anti-Trust Law may be invoked against distributors and producers of farm products will be decided by the United States Supreme Court. The court agreed to review the decision of Judge Charles E. Woodward in the Chicago milk case and set Nov. 13 for a hearing on the case. A decision is looked for before the end of the year, or very soon thereafter.

Label Regulations Issued

Comment of industry on the Department of Agriculture's tentative regulations governing the January to July (1940) additional labeling time extension, as granted in the Lea Act, indicated that industry as a whole is inclined to regard the rules favorably. These tentative regulations were published in the *Federal Register* on Nov. 1. Industry was especially pleased with their simplicity.

Construction News

	Pending (thousands)	Awarded November (thousands)	Total Awarded 1939 (thousands)
Bakery	$1,440	$40	$3,724
Beverages	795	317	5,799
Canning and Preserving	250	.....	200
Confectionery	50	.....	125
Grain Mill Products	420	120	3,400
Ice Manufactured	202	.....	490
Meats and Meat Products	500	.....	1,031
Milk Products	575	200	1,901
Miscellaneous	910	162	3,510
	$5,142	$839	$20,180

Sardine Code Proposed

Proposed trade practice rules for the sardine industry were announced recently by the Federal Trade Commission. The trade practice code establishes definitions of terms used in the industry, and prevents the sale of sardines unfit for use, the misuse of such terms as "natural style", misrepresentation of "seconds" and so forth, misrepresentation of industry's products, deceptive depictions, imitation of trademarks, tradenames etc., the use of slack-filled or short-weight containers, the defamation of competitors or disparagement of their products, substitution of inferior products for those ordered, misuse of the word "free", fictitious prices, false invoicing, inducing breach of contract, commercial bribery, enticing away employees of competitors, unfair threats of infringement suits, unduly restricting competition through confinement selling, selling below cost and unfair pricing practices.

England Limits Fruit Imports

The British Board of Trade states that imports of grapes from the United States, which are among the products admissible to the United Kingdom only under license since Sept. 5, are being restricted to 25 per cent in sterling value of last year's imports, and that importations of other soft fruits are permitted only from Empire sources.

Food Duties Lowered

Wheat flour, oatmeal, prepared milks and lard are among the foods on which concessions were granted to the United States in the reciprocal trade agreement with Venezuela, signed, Nov. 6. And concessions or bindings were made on canned fruit, dried fruit, canned fish, bacon and hams, confectionery, unsweetened crackers and biscuits, and chewing gum. No food products are included in the concessions granted by the United States except for such tropical products as tonka beans.

Commodity Prices Steady

With no significant change occurring in the general level of commodity prices between Sept. 30 and Nov. 11, it is likely that a new plateau has been reached, somewhat higher than that existing earlier in the year. *The New York Journal of Commerce's* general weekly index of commodity prices stood at 81.1 on Sept. 30 and at the same figure on Nov. 11. In contrast, through most of the year prior to the war, this index had a 73 to 75 range.

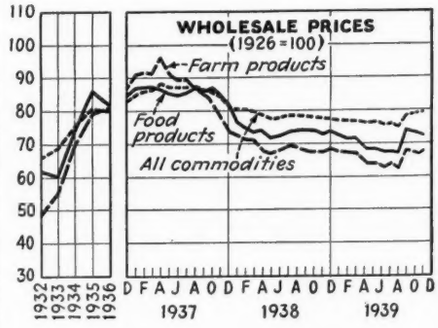
The food commodity index and the grain index of the same publication did not, however, remain quite as steady. Grains rose in price, from an index of 63.1 on Oct. 14 to 65.2 on Nov. 11. In contrast, the food index decreased from 70.8 to 68.5 in the same period.

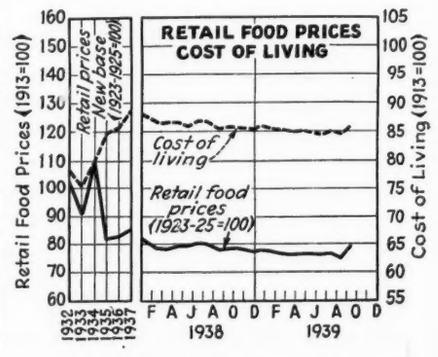
Dairy Products Outlook

Production of milk should increase in the near future, as the number of milk cows is on the increase and is expected to grow more rapidly in the next two years than was the case in the past two years. Total production of manufactured milk products is expected to continue at high levels in 1940, but not to show much change over 1938 or 1939, according to a recent survey of the U.S. Department of Agriculture.

Canning Crop Outlook

Plantings of crops for canning in 1940 are expected to exceed plantings in 1939, because the relatively lowered outputs this year will result in below average carry-overs of many lines into the 1940—1941 marketing year. The prospect is for better wholesale prices





of canned foods during the first half of 1940. This should permit of making more favorable contracts with growers, another factor tending to increase output.

Among the acreage increases forecast by the U.S. Department of Agriculture are 28 per cent for peas, 12 per cent for snap beans, 50 per cent for sweet corn and 28 per cent for tomatoes.

Outlook for Meat Production

A recent report of the U.S. Department of Agriculture forecasts for 1940 the largest production of meat since 1924. It is likely that all of this increase will be accounted for by greater output of pork products, as it is not expected the production of lamb and beef will increase.

It is also expected that 1940 will see some increase in exports of lard and pork, but this increase is not expected to be as great as the increase in output of these products.

Poultry output is expected to be larger in the first six months of 1940 than in corresponding months of 1939, but because of an expected decrease in the hatch in 1940, marketings of poultry in the last six months of the year may fall below marketings for the last six months of this year.

Data for the Charts

In preparing the curves shown on this and the preceding page of FOOD INDUSTRIES, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week.*

INDICATORS

CREAMERY BUTTER production in September, 1939, was estimated to be 134,515,000 lb., compared to 151,070,000 lb. in September, 1938. Production for first nine months of 1939 was 1,406,408,000 lb., up 7 per cent above the like period of 1938.

CHEESE PRODUCTION in September, 1939, at 45,075,000 lb., was next to the highest September output ever recorded, and compared to 44,165,000 lb. produced in September, 1938, and to a 1930—1937 average of 37,205,000 lb. for September.

OLEOMARGARINE SALES in September, 1939, as indicated by sales of internal revenue stamps, amounted to 30,805,486 lb., 14.5 per cent below the sales of 36,039,306 lb. recorded in September, 1938.

CORN packed in 1939, according to most recent estimates, totaled 15,290,580 cases, compared to 20,846,842 cases packed in 1938. These figures do not include the corn-on-cob pack.

ASPARAGUS canned in 1939 totaled 2,519,892 cases, compared to 2,403,214 cases packed a year previous.

SUGAR DELIVERIES up to Sept. 30 of this year totaled 5,521,110 short tons, raw value, compared to 4,926,521 tons in the same months of 1938.

SUGAR STOCKS on hand in the U.S.A. on Sept. 30, 1939, were 920,650 short tons, compared to 1,181,493 tons a year before.

CONFECTIONERY and competitive chocolate products sales in September, 1939, are reported at $25,493,000, compared to $25,168,000 in September, 1938, and to $16,048,000 in August of this year.

FLOUR PRODUCTION in October, 1939, as reported by *The Northwestern Miller* for mills representing 64 per cent of U.S. capacity, amounted to 6,381,680 bbl., compared to 6,448,458 bbl. in October, 1938, and 950,000 bbl. below September, 1939, output.

FRUITS, frozen, in storage on Nov. 1, 1939, totaled 141,970,000 lb., compared to 143,848,000 lb. on Nov. 1, 1938, and to a 1934—1938 average of 102,493,000 lb. for the date.

VEGETABLES, frozen, in storage on Nov. 1, 1939, totaled 77,172,000 lb., compared to 71,391,000 lb. a year before.

BUTTER, creamery, in storage on Nov. 1, 1939, was 128,147,000 lb. The figure a year before was 195,263,000 lb., and the 1934—1938 average was 126,108,000 lb. for the date.

CHEESE, all kinds, in storage on Nov. 1 this year amounted to 114,746,000 lb., compared to 132,326,000 lb., on Nov. 1, 1938, and to an average for the date in 1934—1938, of 118,732,000 lb.

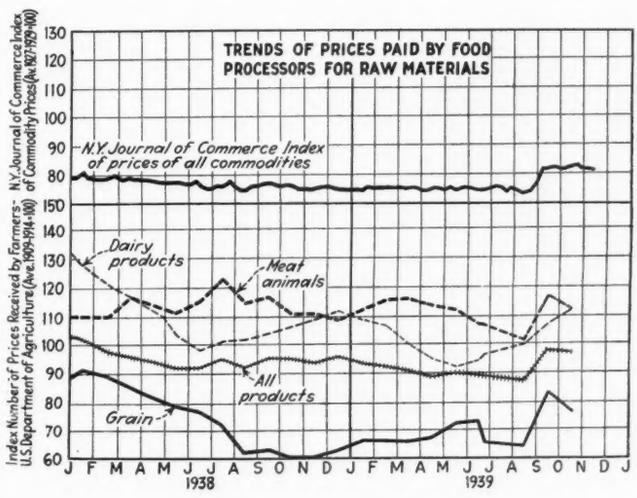
EGGS, case equivalent, in storage on Nov. 1, 1938, totaled 6,508,000 cases. On Nov. 1, 1938, the figure was 5,938,000 cases and the average for Nov. 1 in 1934—1938 was 7,075,000 cases.

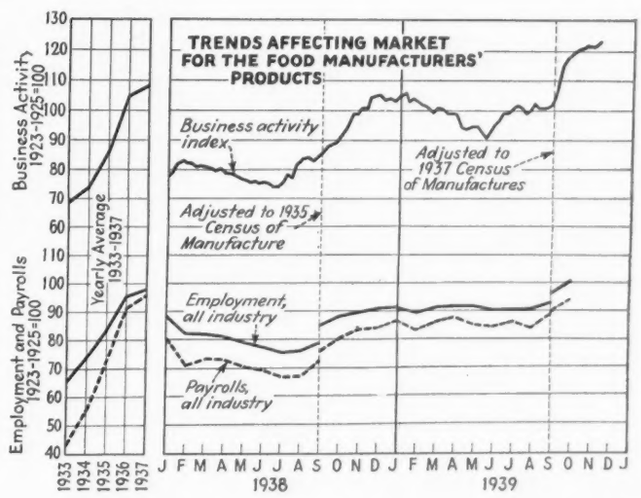
POULTRY, all kinds, in frozen storage on Nov. 1 of this year amounted to 79,282,000 lb., compared to 77,692,000 lb. on Nov. 1, 1938 and to a Nov. 1 average in 1934—1938 of 77,088,000 lb.

MEAT, all kinds, in cure and frozen storage, on Nov. 1, 1939, was 383,000,000 lb. A year before the figure stood at 345,737,000 lb. and the Nov. 1 average was 465,671,000 lb. for the years 1934 to 1938.

LARD in storage on Nov. 1, 1939, totaled 68,136,000 lb., compared to 67,667,000 lb. on Nov. 1, 1938, and to a 1934—1938 average of 69,623,000 lb. for the date.

WEEKLY FOOD INDEX of Dun & Bradstreet, Inc., stood at $2.43 on Nov. 7, compared to $2.40 one year before.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
Index Number of Prices Received by Farmers-U.S. Department of Agriculture (Ave. 1909-1914=100)
N.Y. Journal of Commerce Index of Commodity Prices (Av. 1927-1929=100)
Cost of Living (1913=100)
1938
1939



Men, Jobs & Companies

INDUSTRY

Archer-Daniels-Midland Co. has installed additional machinery at its plant in East Toledo, Ohio, to enable it to handle a larger quantity of soy beans.

Becker Pretzel Baking Co., Inc., Richmond, Va., is planning to construct a two-story and basement plant addition measuring 60x137 ft.

Coca-Cola Bottling Co. of Youngstown, Ohio, will build a $60,000 bottling plant of modernistic design.

Joe Fink & Co. is building a new meat packing plant at Birmingham, Ala.

Franklin Creamery Co., Toledo, has purchased 104 acres of land and will erect a $100,000 plant on it. A private air field, an aviation country club and four other buildings also will be erected on the site.

Growers Cold Storage Corp., Miami, Fla., a subsidiary of Dade County Growers Cooperative Marketing Association, has completed a new cold storage warehouse costing $73,000. Power for refrigeration is obtained from diesel engines.

Froedtert Grain & Malting Co., Milwaukee, has embarked upon a $200,000 powerhouse rehabilitation program.

Hills Bros. Coffee Co., San Francisco, has selected a site at Edgewater, N. J., for a new coffee plant which will cost about $1,000,000.

Hygrade Food Products Corp. will open a new ham canning factory in Buffalo in the near future.

Kraft-Phenix Cheese Corp., Chicago, recently opened a new plant at Athens, Tex., and it is planning a plant at Rusk, Tex.

Loose-Wiles Biscuit Co. plans to construct a $500,000 plant at Oakland, Calif., in which it will manufacture the biscuits formerly produced in the East and shipped to this area. The plant will be a straight-line production unit, approximately 1,200 ft. long and 100 to 150 ft. wide.

National Biscuit Co., New York, will build a $1,000,000 straight-line production plant at Denver, Colo., for completion within a year. The plant will be a one-story structure measuring 1,200x600 ft. It will serve the entire Rocky Mountain area. National Biscuit recently opened for public inspection its new plant at Houston, Tex. This plant is a one-story building and has a capacity of 1,000,000 lb. of bread and rolls per month. The company has begun construction of a similar plant with the same capacity at Birmingham, Ala. The cost is placed at $100,000.

WATSON H. VANDERPLOEG

He has been promoted to the presidency of Kellogg Co., Battle Creek, Mich., replacing W. K. Kellogg, founder and active head of the company since 1906. Mr. Vanderploeg retains the duties of general manager which he assumed last July. Mr. Kellogg becomes chairman of the board. Joel S. Mitchell has been made first vice-president.

ROBERT W. GRIGGS

Standard Brands, Inc., New York, has made him manager of a newly organized New Products Department. D. B. Stetler has succeeded him as advertising manager. Daniel P. Woolley has retired as vice-president.

Neuhoff Bros. held formal opening on Nov. 5 of its enlarged plant at Dallas, Tex. The cost of the building and equipment amounted to $500,000. The plant has a capacity of 3,000 hogs, 1,000 cattle, 1,500 calves and 500 sheep per week.

Safeway Bakery formally opened its new plant at Dallas, Tex., on Oct. 26. The plant, which will serve some 200 stores in its territory, is equipped with two large tray ovens.

Southern Dairies has started construction of the second new building to be added to its Jacksonville, Fla., plant this year.

Swift & Co., Chicago, has obtained court approval of a plan of distributing its majority interest in Libby, McNeill & Libby. The company will sell its holdings in the canning firm to the public next spring.

Tivoli Brewing Co., Detroit, has started construction of a $350,000 five-floor addition to its stockhouse. The unit will have a capacity of 51,000 bbl.

Van Camp Sea Food Co., Terminal Island, Calif., recently acquired a plant at San Pedro, Calif., which had been operated by California Packing Co. The plant, which is reported to have sold for $200,000, is equipped for canning tuna, mackerel and sardines. The plant has been inactive for some time.

Vanti Pa-Pi-A Beverage Co. of Florida opened a modern new bottling plant in Miami on Oct. 21. The plant, built at a cost of $60,000, will produce a carbonated beverage made from the papaya. The company is a subsidiary of Hecker Products Corp., New York.

PERSONNEL

J. B. Allen, Columbia, S. C., has been re-elected president of Piedmont Millers' Association.

Dr. Paul B. Brooks, New York state deputy commissioner of public health, has been elected president of the International Association of Milk Sanitarians.

J. H. Brown has resigned as chief of the income tax unit of the Toledo (Ohio) Bureau of Internal Revenue to

become secretary-treasurer of Toledo Soybean Products Co.

W. P. Butler, for the last seven years manager of Kellogg Co. of Canada, Ltd., at London, Ont., has been appointed plant manager at Battle Creek to succeed Donald E. Marshall, who has resigned.

James W. Carkner has become chairman of Loft, Inc., Long Island City, N. Y., and has resigned as president, a position which he held for four years. His successor has not been named by the candy company.

C. L. Dilts has been named superintendent of all Eastern branches of Fairmont Creamery Co. W. H. Wright succeeds him as branch manager at Cleveland.

Frank Dowe, Jr., sales manager of the American Research Products division of General Mills, Inc., has been named vice-president in charge of sales, with headquarters in New York.

Charles A. Dunning has been elected vice-president and a director of Ogilvie Flour Mills Co., Ltd., Montreal. Until last summer he was minister of finance in the Canadian Government.

Dr. E. S. Guthrie, Cornell University, Ithaca, N. Y., has advanced from vice-president to president of American Dairy Science Association. Harry Cave, professor at Oklahoma A. & M. College, Stillwater, has been elected vice-president.

George L. Jorgenson, formerly with Fohrman & Forster Co., Chicago, has joined Essem Packing Co., Inc., Lawrence, Mass., in an executive capacity.

Frank W. Kelly has been named president and general manager of Gridley Dairy Co., Milwaukee, succeeding L. A. Bletzer, who becomes chairman of the board.

Emil W. Marten, Spencer, again heads Central Wisconsin Cheesemakers', Buttermakers' and Dairymen's Advancement Association.

Carl J. Ohlson, former sales manager of the refinery division of Durkee Famous Foods, has been named general sales manager of the company's western district.

E. H. Parfitt, dairy professor at Purdue University, Lafayette, Ind., will assume the duties of administrator of sanitary standards for Evaporated Milk Association, Jan. 1.

John Pirie, secretary-treasurer of Purity Bakeries Corp., Chicago, was elected a director of the company to succeed M. L. Molan, resigned.

F. G. Plott, secretary and general manager of Fairmont Creamery Co., Green Bay, heads up the Wisconsin Milk Dealers Association.

Earl Prince, Sterling, Ill., has been elected president of National Association of Ice Cream Manufacturers.

B. C. Schuck has resigned as manager of Rhinelander (Wis.) Brewing Co. to become manager of Mathie-Ruder Brewing Co., Wausau, Wis.

George M. Thorne has been appointed sales manager of Griesedieck-Western Brewery, St. Louis.

George E. Vance has been appointed director of public relations for Rio Grande Valley Citrus Exchange, Weslaco, Tex.

Edward J. White, president of Honor Brands Frosted Foods, a subsidiary of Stokely Bros. & Co., is now located at the Stokely headquarters in Indianapolis.

A. W. Wilkins has been named manager of the Laconia, N. H., branch of Swift & Co., succeeding Elias Johnson, retired.

DEATHS

John W. Barber, 30, former Philadelphia plant manager of Ward Baking Co., Nov. 13. His father, John M. Barber, is vice-president of the Company.

Louis Baujan, 75, president of Nashville (Tenn.) Roller Mills, Nov. 9.

Harry L. Betty, 59, formerly vice-president of J. J. Dougherty Candy Co. and president and general manager of Belmont Candy Co., Oct. 16, at Memphis, Tenn.

D. S. Brackett, 72, retired vice-president and former sales manager of Ralston Purina Co., Nov. 5, at St. Louis.

John William Butler, 65, for 38 years superintendent of W. F. Schrafft & Sons Corp., Oct. 27.

Lester Claster, 49, president of Food Sales, Inc., marketing subsidiary of National Dairy Products Corp. of which he was a director, and also a director of Kraft-Phenix Cheese Corp., Nov. 9, at New York.

John A. Dickens, 79, partner in the former Layton Packing Co., Milwaukee, Oct. 19.

David J. Gregory, Sr., 77, founder and president of D. J. Gregory Vinegar Co., at Richmond, Va., recently.

Adolph Lindstrom, 80, one of the organizers of Union Fishermen's Cooperative Packing Co., Astoria, Ore., recently.

Joseph M. Mathews, 64, manager of the East St. Louis mill of Ralston Purina Co., Oct. 25.

Frank H. Raymond, 49, plant superintendent of Fremont Canning Co., Oct. 29, at Fremont. He had served as a director of National Canners Association and secretary-treasurer and president of Michigan Canners Association.

George Scheuer, 83, president of George Scheuer, Inc., Scranton, Pa., Oct. 29.

Gottlieb Storz, 87, pioneer Omaha brewer and head of Storz Brewing Co., Omaha, Neb., Oct. 24.

John Zimmerly, 84, secretary-treasurer of Zimmerly Bros. Packing Co., Akron, Ohio, Oct. 23.

T. C. HAYES

He has been named president and general manager of Loudon Packing Co., Terre Haute, Ind., succeeding Stewart Rose, Sr., who becomes chairman of the board of directors. Mr. Hayes will also continue in charge of the American Packing Division of this company.

ASSOCIATED INDUSTRIES

Caterpillar Tractor Co., Peoria, Ill., has appointed V. H. Wallace as western sales manager to succeed the late H. H. Chambers. His headquarters will be in San Leandro, Calif.

Creamery Package Manufacturing Co. reports the death of Chalmers M. Cory, general sales manager, on Nov. 11, at Evanston, Ill.

Goodyear Tire & Rubber Co., began construction on Nov. 27 of a Pliofilm factory at St. Mary's, Ohio. The plant will increase the production of that company's product by 50 per cent.

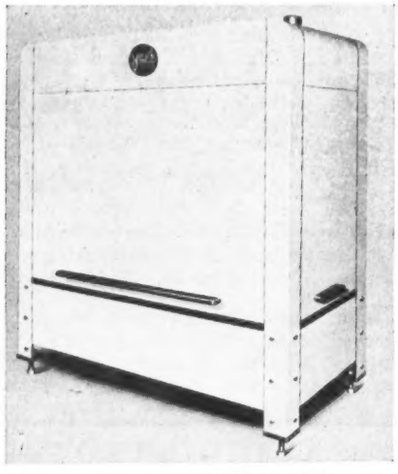
Owen-Illinois Glass Co., Toledo, Ohio, has transferred Dr. J. H. Toulouse, former technical sales engineer, to the general manufacturing department as chief service engineer.

Sterling Pump Corp., Hamilton, Ohio, has appointed Henry J. McKenzie as executive vice-president.

in such a manner that extremely close contact is obtained, permitting rapid exchange of heat from flame to air. All inner surfaces exposed to the heat are of insulating refractory material for durability in service. The burner is electrically ignited and is equipped with flame safety control which automatically shuts off the gas in the event of flame failure. These new air heaters are said to produce temperatures ranging up to 1,000 deg. F. and can be supplied with automatic temperature control. Four standard capacities are available, ranging up to 1,125,000 B.t.u. per hour.

Water Cooler

York Ice Machinery Corp., York, Pa., has designed a water cooler for supplying uniformly cold, clean, fresh water for beverage plants, bakeries,



Water cooler for supplying cold water in beverage plants, bakeries, dairies and similar food operations.

dairies and other food operations. This is called the "High-K" spray type water cooler. It is offered in three models holding from 1 to 6 plates. The largest unit has a 90-ton refrigerating capacity.

A feature of this new cooler is that it has been given a pleasing appearance without any sacrifice of easy accessibility for inspection or cleaning.

Adjustable Speed Motor

Louis Allis Co., Milwaukee, Wis. has developed the "Adjusto-Speed" motor, said to incorporate a new principle in alternating current adjustable speed motor. This new development is a combination of an eddy current clutch and a standard constant speed squirrel cage motor. There is no mechanical contact between the driving and the driven members of the unit. The speed and torque variations are obtained by controlling the magnetic excitation of the clutch, thereby obtaining any desired slip. Advantages of this new motor are said to be that the following functions can be performed without any jar, shock or stress on the driven part: gradual or quick acceleration of load; rapid intermittent starting and disconnecting of load; absorption of torsional impulses and vibration.

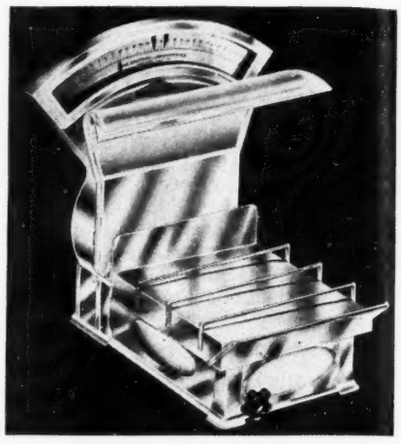
The new adjustable motors have a range of speed variations from zero to full speed at full load point and can be operated continuously at low speed without overheating.

Milk Plant Microscope

Bausch & Lomb Optical Co., Rochester, N. Y. are making a milk plant microscope outfit for the milk plant operator or inspector for use in the simplified Breed method of bacteria counting. This outfit is entirely portable. It is equipped with a leatherette covered wooden carrying case in which the full equipment can be packed.

Food and Meat Scale

A ham pickle percentage scale for packing plants, and also useful in other industries, designed to eliminate possibility of corrosion from salt brine, has been placed on the market by the Griffith Laboratories, Chicago, Ill. In this scale all parts are constructed either of stainless steel or Monel metal and the scale is in natural metal finish with no paint or enamel. The scale mechanism is the Triner counter-balance postal scale mechanism. The calculating device for controlling the percentage of pickle added



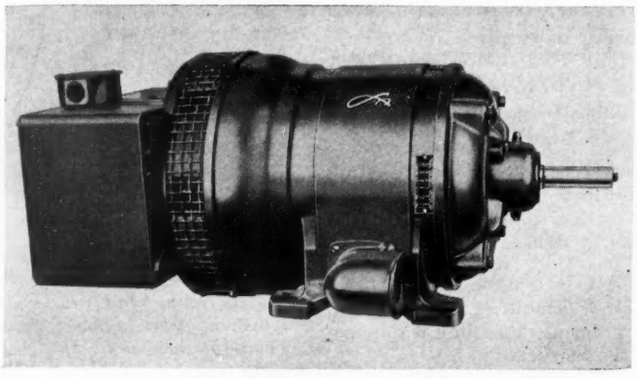
Non-corrodable food and meat scale.

to the meat or percentage of ingredients added to other mixes if used for other purposes, is covered by Griffith Patent No. 2,170,706. It consists of two calculating needles, one of which is brought into register with the weight needle after the ham is on the scale, by turning the knob at the front of the scale case. The second percentage needle shows the weight that the ham should have after the proper percentage of pickle has been pumped into it or with other foods after a certain percentage of additional material has been added. A simple adjustment is provided to indicate an 8, 10, 12 or 15 per cent addition, automatically figured on the original weight of the ham or other product.

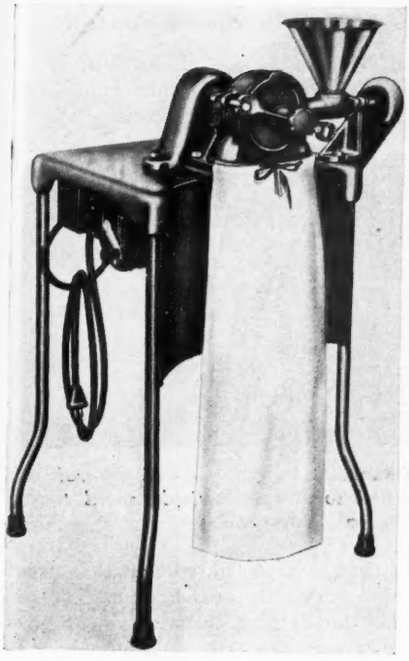
Small Pulverizer

Pulverizing Machinery Co., Roselle Park, N. J., has developed a small pulverizer called the "Bantam". This unit is designed for small pulverizing jobs where it is uneconomical to handle the work on a large machine. It is also suitable for laboratory and experimental work.

The new machine is 22x23 in. and 43½ in. high. It can be supplied for



Adjustable speed a.c. motor.



Small portable pulverizer for production and laboratory work.

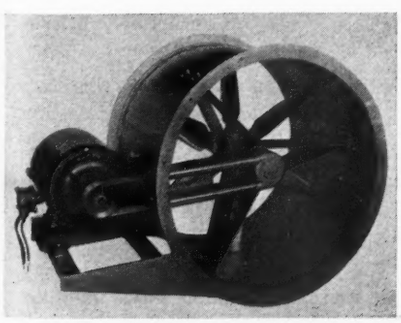
60, 50 or 25 cycle a.c. operation, for d.c. motor, or with hand crank feed. Its weight is 175 lb. and the capacity ranges from 30 to 200 lb. per hour, depending upon the character of the material being pulverized.

The machine is equipped with rubber-tired casters when desired for easy portability.

Duct Line Fan For Explosive Atmospheres

SOUTH BEND AIR PRODUCTS, INC., South Bend, Indiana, has brought out a new fan unit designed for use in duct systems, and said to be especially suitable where explosion hazards exist. This is available in both single and tandem fan types, for static pressures up to 3 in. Single fan unit capacities are from 1,600 to 26,000 cu.ft. per minute, with tandem units ranging from 1,600 to 30,000 cu.ft. per minute.

The unit is installed in the duct line by means of flanges on each end. The motor is outside, supported on the unit, and drive is by completely inclosed belt, with adjustable tension. Fan blades are of drop forged aluminum, which is non-sparking and safe in explosive atmospheres.



Duct line fan unit constructed for safe operation in explosive atmospheres.

Electric Hoists

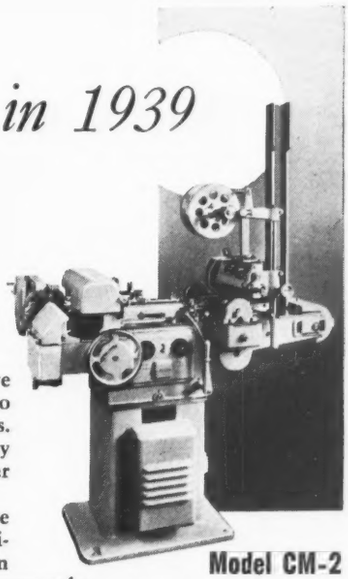
COFFING HOIST CO., Danville, Ill. have brought out the "Quik-Lift" line of electric hoists in capacities from 250 to 4,000 lb. The weight range of these hoists is from 89 to 195 lb. making it easy to move the hoist from one point to another to accommodate various plant needs. The hoists are equipped with either a.c. or d.c. motors as desired, and are designed to withstand a 200 per cent overload. Full safety features are provided.

Control Instrument Reset

A DEVICE for compensating automatically for shifting of the control point in control instruments of the throttling

What we've been doing in 1939

MAY SAVE YOU MONEY IN 1940



1939 has been a busy year for us. Manufacturers have been calling for new types of wrapping machines to carry out a wide variety of package improvements. And the need for lower costs has prompted many concerns to replace obsolete equipment with our faster, modern machines.

Such activity is an added stimulus to inventive ingenuity. In the past year, our designers and engineers have produced outstanding improvements in machine design and construction which may prove extremely valuable in lowering your costs. Something to take advantage of in 1940.

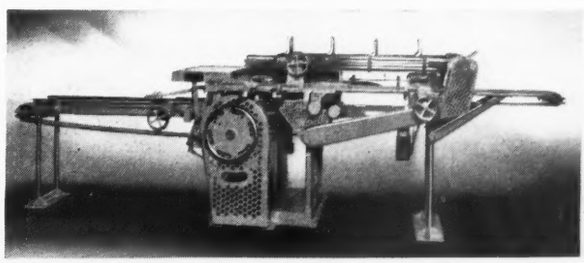
In addition to producing a better package, modern machines invariably operate at much higher speeds; they save floor space; require less supervision; and are more flexible —adjustable to various size packages. In some cases, their greater capacity makes it possible to step up efficiency along the entire production line.

Why not make a note *now* to look into the subject with us? Write us, or consult our nearest office for assistance in package improvement or ways of lowering costs.

Model CM-2

High Speed of 380 per min.

Extremely high speed — from 250 to 380 packages per minute, depending on size of package. Designed to wrap comparatively small packages — quickly adjustable for different sizes within its range. Uses plain, moisture-proof, or heat-sealing transparent cellulose in roll form. In addition to usual type carton, wraps boats containing loose articles.



Model FA-2-Q *The Last Word in Flexibility*

Handles an extremely wide range of sizes. Can be changed from one size to another in only 10 minutes. (This change covers all three dimensions.) May be equipped to handle any type of wrapping material — printed material can be used in economical roll form, registered accurately by Electric Eye. Wraps open boats, turned-up-side trays, and extension-edge boxes, as well as ordinary cartons.

PACKAGE MACHINERY COMPANY, Springfield, Massachusetts

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

Peterborough, England: Baker Perkins Ltd. Melbourne, Australia: Baker Perkins Pty., Ltd.
Mexico, D. F., Apartado 2303 Buenos Aires, Argentina: David H. Orton, Maipu 231

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

type has been developed by American Schaeffer & Budenberg Instrument Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn. Called the "American Micromoto Reset", this device automatically returns the controlled temperature or pressure to control or set point after a load change occurs. It begins to function immediately when a change in load occurs and brings the controlled temperature back to the correct point as rapidly as the process will permit. This type of reset is designed for application in such operations as continuous pasteurizing where the use of a throttling temperature controller is necessary and where wide fluctuations in the control temperature cannot be permitted.

In new installations of controllers, made by the manufacturer of the new reset, it is supplied built-in. In existing installations, the reset device can be installed in the diaphragm motor valve line and it is not necessary to disturb the control instrument in any way.

Yale Brings You CABLE KING The Only Electric Hoist That Offers AIR-COOLING

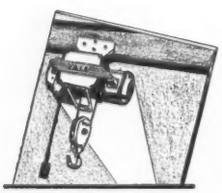
Capacities ¼ to 6 Tons

Introduced by Yale just a short time ago, the Cable King with its AIR-COOLING feature is already skyrocketing its way to leadership in the electric hoist field. NOW everybody wants AIR-COOLING!

The reason is simple. AIR-COOLING saves the operator money. The basic limiting factor in electric hoist construction has always been excess brake heat. When Yale engineers adapted the special sirocco blower action that would cool the brake frictional parts they, *for the first time,* made it possible to eliminate this heat.

That's the principle of AIR-COOLING—a principle that permits *the Cable King to operate on a heavier duty cycle than any other hoist in the same class.* And that means *greater economy than any other hoist in the same class!*

In addition, the precision construction of the Cable King makes it the closest approach to perfect engineering specifications that has ever been built. AIR-COOLING plus mechanical perfection—that's what you get in the Cable King. It's the very latest advance in hoisting equipment.



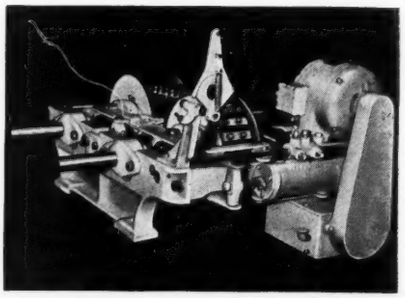
Contact your local distributor or send direct for free catalogue.

YALE TRADE MARK

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

Hydraulic Speed Control

REEVES PULLEY Co., Columbus, Ind., has designed a hydraulic automatic control for use with its variable speed



Automatic hydraulic speed control attached to Reeves variable speed transmission

transmissions. The combination provides automatic speed regulation to make possible synchronization of different machines, or of separate sections of the same machines.

Flow Ratio Control

AUTOMATIC CONTROL of the rate of flow of one fluid in a definite ratio to that of a second fluid is accomplished by the new flow ratio controller of the Bristol Co., Waterbury, Conn. A feature of these controllers is an arrangement which permits changing the ratio at any time by the turning of a knob on the outside of the instrument case.

Reel Ovens

AMERICAN MACHINE & FOUNDRY Co., 511 Fifth Ave., New York City, has developed a new design of reel ovens said to be particularly adaptable to baking a variety line of goods. It is said that this oven will serve as an all-purpose oven for the smaller bakery or as an auxiliary oven for the large bakery. It is provided with convenient operating controls, automatic heat control, double doors and is designed with modern styling.

Cold Milk Filter

DAMROW BROS. Co., Fond du Lac, Wis., have developed a new system of cold milk filtration, including new filters which will handle milk successfully when as cold as 40 deg. F., in capacities up to 25,000 lb. of milk per hour through a single unit.

These filters combine a receiving tank and a horizontal filter unit. As the milk enters the tank, it strikes a baffle plate, which breaks the force of its fall and guides it over the side

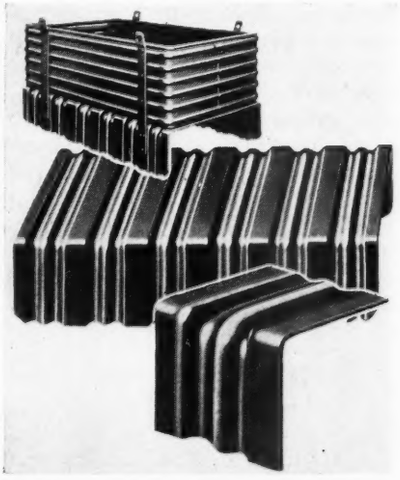
where any heavier extraneous matter is deposited in a sediment pocket. The milk then flows through a fine mesh filter cloth held in horizontal position over a perforated metal disk by a clamping ring. Churned butter fat cannot clog this filter cloth, because a float control keeps a constant depth of 8 in. of milk over it. In this way butter particles are caused to float on top until the filter is pumped empty at the close of the run. Forcing of dirt through the cloth is prevented by placing a centrifugal pump on the outlet side of the filter instead of on the inlet side.

The milk then flows into the filter proper, which is a Damrow horizontal filter unit of new design, providing up to 4 sq.ft. of area. This filter is made up of a series of metal plates held one above the other and compressed tightly together. The milk passes between these plates from the outside periphery to a central discharge point, being filtered by means of fabric disks held between each two plates.

These cold milk filters are available in two sizes: 25,000 lb. per hour capacity and 50,000 lb. per hour.

Steel Skid Platform

UNION METAL MFG. Co., Canton, Ohio, is manufacturing an all-steel lift truck skid platform. This is available as a plain skid platform or with various types of corrugated steel boxes or containers mounted upon it. The feature of this new skid is that it is made in a special ribbed and recessed construction which is said to provide



New type of all steel corrugated skid platform.

exceptional strength particularly at the knee of the platform where both the rib and the recess continue in an uninterrupted curve into the platform leg.

Rubber Edged Beater

AMERICAN MACHINE & FOUNDRY Co., 511 Fifth Ave., New York, has developed a new rubber-edged beater, for scraping the sides and bottom of the mixing bowl on vertical mixers. It is claimed that with this beater a continuous scraping of the rubber edge against the bowl eliminates the need for hand scraping, and also that the beater is particularly efficient on high ratio batches of batter. The drop-center design is said to overcome the difficulty of batter climbing up the shank of the beater.

Stainless-Clad Metal

JESSOP STEEL Co., Washington, Pa., is now manufacturing stainless steel clad-steel sheets and plates known as "Silver-Ply". These plates are offered

N.B.C.

. . . . *means*

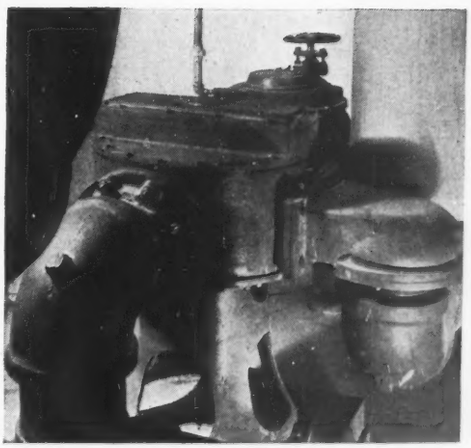
Quality

in

CRACKERS

and

COOKIES



Still on duty, this Industrial Carburetor has fired N. B. C. ovens for many years.

National Biscuit Company has brought together great bakers, great engineers, great salesmen—all under the banner of the red N.B.C. Seal of Perfect Baking.

Which explains (we think) why you will find the Kemp Industrial Carburetor firing Kemp burner equipment in those vast glistening ovens through which pass, in marching millions every day, Ritz Crackers and numerous other varieties known the world over.

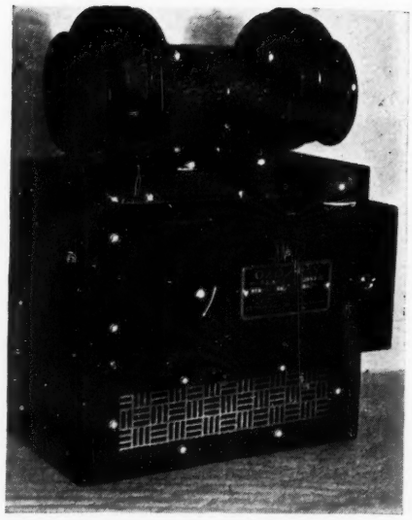
Getting curious about Kemp? Want to know how much Kemp 100 percent premixing of gas and air will cut *your* costs in roasting, baking, high temperature cooking, can making? Just ask. We tell you before you buy, back up our claims with a copper-rivetted guarantee. Address **The C. M. Kemp Manufacturing Co. 405 E. Oliver Street, Baltimore, Md.**

KEMP of BALTIMORE

for the fabrication of all sorts of equipment used in the processing of foods and other products where freedom from corrosion or contamination of product is desirable. The material can be bent, spun, deep-drawn, drilled or otherwise worked with greater ease than solid stainlesss steel. It is said to have high conductivity and not to be subject to hot spots. The usual sheet or plate of this metal consists of 20 per cent stainless steel and the balance mild steel of flange quality. Where needed, all degrees of stainless cladding from 3 to 50 per cent can be supplied.

Ozone Generator

OZO-RAY PROCESS CORP., 400 North Sangamon St., Chicago, Ill., has developed the "Ozo-Ray" ozone generator for industrial application. This device, as shown in the accompanying photo, is a self-contained unit, made up of a top-mounted twin blower, feeding air to the ozone generator beneath, with a discharge for the treated air below. Mounted on the side of the generator case is a line switch, while on the front of the case is a control unit for ozone generation and volume.



Ozone generating unit which can also be supplied for duct installation.

This ozone generator has a new type of enclosed electrode and is said to produce only pure ozone, with no oxide of nitrogen. Where desired, the unit can be supplied for mounting within a duct in which air is being circulated, instead of with its own fan and discharge, as shown in the illustration.

Lubricant Flow Indicator

INDUSTRIAL INSTRUMENT CO., 96 E. Miller Ave., Akron, Ohio, has developed an indicator for installing in circulating oil lines to bearings and other moving parts of machinery. It operates in connection with a needle valve in the oil circulating line, one flow indicator with a valve being placed in each branch line. Should the oil line plug up between the lubricating pump and the bearing, the indicating hand on the unit moves to danger zone on the dial, informing the operator that something is wrong.

Meat Thermometer

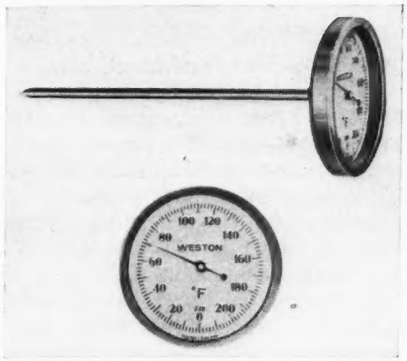
WESTON ELECTRICAL INSTRUMENT CORP., Newark, N. J., has developed an all-metal meat thermometer designed for use in the processing of meats. It consists of a dial and pointer scale encased in stainless steel, mounted flush on a 4-in. stainless steel stem. The steel stem, slightly over $\frac{1}{8}$ in. in diameter, is spike-pointed

★ Cercon is an edible, tasteless wax suitable for coating food products requiring protection from the air.

It is supplied in six colors—Snowdrift, Lemon, Orange, Tangerine, Apricot, and Olive. It has an ASTM penetration of 50 with the 50 gram weight attached.

We will be very glad to send test samples to any interested company.

THE CONEWANGO REFINING CO.
WARREN, PENNSYLVANIA



Meat thermometer for meat packing plants.

and will easily pierce meat to a depth of 4 in. The stem is made of seamless stainless tubing and incloses the temperature element. The scale on the dial has a range from zero to 220 deg. F., covering all normal requirements of meat processing.

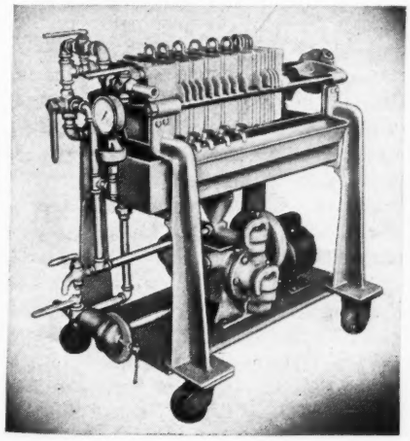
Refrigeration Unit of Small Size

FOR USE in small cabinet and room cooling operations and similar installations, Carrier Corp., Syracuse, N. Y., has refrigeration condensing units of $\frac{1}{4}$ and $\frac{1}{3}$ hp. available. These are compact self-contained units and can be readily installed wherever the user may desire.

Laboratory Filtration Unit

T. SHRIVER & Co., Harrison, N. J., have developed a portable filtration unit combining a small filter press with 7 in. square filter plates and frames for open or closed delivery, a diaphragm pump with strainer, motor and all other features in one unit, mounted on casters.

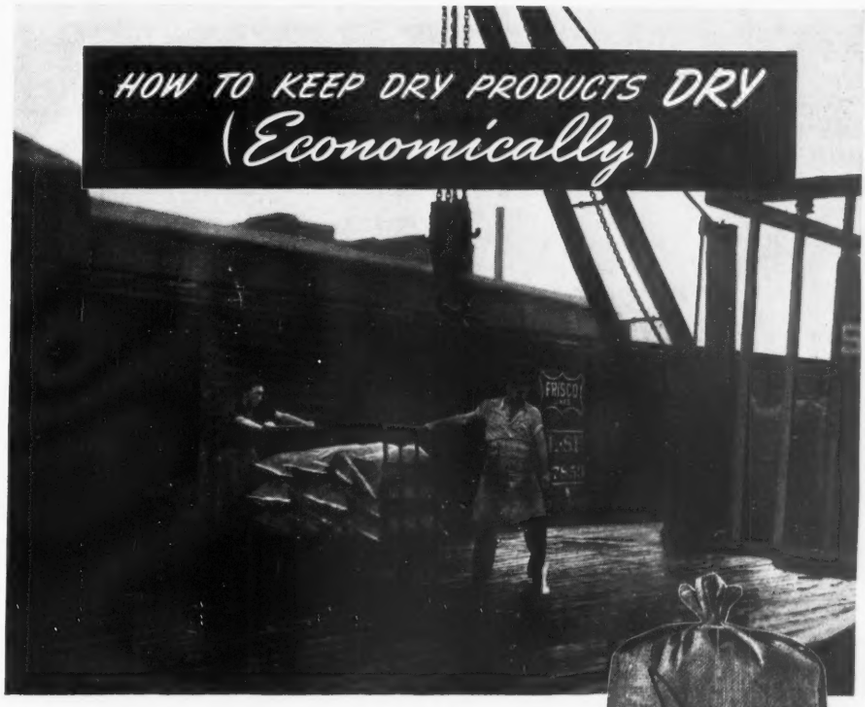
This unit is arranged to provide triple filtration, cake washing, partial drying or clarification, decolorization and bleaching, all in one operation. All parts coming in contact with products may be made of any desirable material in order to prevent corrosion or product contamination.



Small filtration unit suitable for laboratory or experimental work.

Small Steam Generator

A SMALL SIZED electric steam generator of high efficiency, for use where small quantities of steam are needed as in pressure cookers or steam-heated ovens, has been developed by Lamp Div., Westinghouse Electric & Mfg. Co., Bloomfield, N. J. This generator will produce steam from water in less than 15 sec. and has evaporating capacities up to 5.7 lb. of water per hour with superheat up to 350 deg. F. It is available in three sizes, respectively, of 1,000, 1,500 and 2,000 watts input. The generator case, $9\frac{1}{4}$ in. long, is made of transparent glass capable of standing the full pressure developed within.



Ship in Light Weight . . . Low Cost Bemis Waterproof Bags

Today, both makers and users of bulk food products are making welcome economies with Bemis Waterproof Bags.

In scores of cases these light, tough, moistureproof, dirtproof, siftproof containers have practically wiped out damage and loss in transit and storage . . . have reduced packing and handling expense . . have greatly increased satisfaction and goodwill . . . and are delivering all the quality paid for.

Your present containers may be 100%, or only 50% to 75% efficient. It will pay you to know.

Let the Bemis Shipping Research Laboratory check the efficiency of your containers

Without obligation, the Bemis Shipping Research Laboratory will study your particular needs and submit a complete report with recommendations, *if needed.* Phone or write today. Or mail coupon for new Bemis Brochure giving valuable suggestions for better shipping.

Waterproof Department
BEMIS BRO. BAG CO.
402 Poplar Street, St. Louis
5108 Second Avenue, Brooklyn

BEMIS BRO. BAG CO., 402 Poplar Street, St. Louis, Missouri
5108 Second Avenue, Brooklyn, New York
Please send your special brochure and details about use of Bemis Waterproof Bags for_____(Product)
*Firm Name*_____
*Street Address*_____
*City*_____ *State*_____
*Mark for the attention of*_____

FATS AND OILS

Refining Corn Oil

EDIBLE OILS, especially corn oil, are effectively de-slimed and refined by treatment with an organic peroxide at 50 to 60 deg. C. (122 to 140 deg. F.) in presence of a reagent for precipitating slimes. The organic peroxide may be obtained from the foots of the refining process. As the new treatment is described in Canadian Patent 382,087 (granted June 13, 1939, to Vaman R. Kokatnur of 114 E. 32nd St., New York, and O. S. Plantinga) the preferred precipitating agent for de-sliming the oil is fuller's earth or a similar solid adsorbent. A major advantage of such an agent is that it removes free fatty acids from the oil without forming any soap which is soluble in the oil.

FISH

German Views of Fish Freezing

IN THE Ottesen quick-freezing process, the cleaned fish are precooled with ice, laid in wire baskets about 3 ft. wide and 4 ft. long, and passed to a freezing chamber about 65 ft. long. This chamber has three compartments, with cooling coils in the center and a salt-glycerol brine in the end compartments. The baskets, immersed in this brine, move counter-current to the flow of cooling solution. The rate can be adjusted to complete the freezing in one hour or to take several hours. A modern Ottesen plant can freeze 17 tons of fish daily.

The Birdseye process, which is a great improvement over Cooke's method, is a leader among indirect quick-freezing processes. It is especially suitable for large scale production.

The spray method, developed by Zarotchenzeff and known as the Z process, provides direct freezing in a tunnel divided in three compartments. In the first, the fish are flushed with cold water. Freezing is effected in the second compartment by a spray, which gives rapid heat transfer from the droplets of freezing solution to the fish. The spray heads are movable, to permit uniform coverage. The temperature of the freezing solution is about 2 deg. F. In the third compartment the freezing solution is rinsed off. A major advantage of the spray method is rapidity.

Herring can still be smoked successfully after three or four months at –4 deg. F., or six months at –22 deg. F. Frozen fish should be protected from oxygen by glazing with water, or better still with brine.

Digest from "Preserving Fish by Freezing," by Willi Rudolph, *Chemiker-Zeitung* **63**, 555, 1939 (Published in Germany).

FRUIT JUICES

Fruit Juice Standardization

THROUGHOUT EUROPE, wherever apples are grown, there is a cider industry. In Czechoslovakia, Hungary, Poland, France, Holland, Denmark and Sweden production is still in the pioneering stage. But in some other countries, as in Switzerland, Germany and England, commercial production is old enough to have turned toward modern methods and toward adaptations governed by local preferences. Thus, in Saxony fruit wines are not filtered and when apple juice was marketed people liked it cloudy, whereas in the Rhineland it is customary to prepare sparkling, filtered wines and consumers accordingly demanded filtered apple juice.

A primary motive for marketing bottled or canned juice is utilization of surplus fruit, a motive which is giving the industry a foothold also in Canada, Australia and New Zealand. Unfortunately, fruit juice products are easily adulterated, or even faked, since the public cannot readily judge the amount or quality of genuine fruit used in a product as against cheap imitation materials. Hence, there is a strong movement for setting up definite standards of quality for apple and other fruit juices, also for sirups and jams. Probably separate standards should be established for fresh undiluted juices, sweetened juices and concentrates. In Great Britain the immediate policy is to seek aid from the Ministry of Agriculture and the Ministry of Health for standards most urgently needed, while the long term policy is to work toward acceptable standards for all beverages.

Digest from "Fruit Juice Standardization," by C. P. Norbury, and "World Developments in Fruit Juice Production," by R. C. Morel, *Chemistry and Industry* **58**, 551, 552, 1939 (Published in England).

SUGARS & STARCHES

Maple Sugar Buckets And Lead Contamination

CONTAMINATION of maple sirup with lead is common, and sometimes severe enough to menace health. The lead must come from equipment used in handling and processing, since maple sap is lead-free. The source may be terne plate (lead-tin coated iron) used in buckets and tanks, or lead-tin solder in metal joints, or lead-pigmented paints. Proper painting with lead-free paints would eliminate all these sources of contamination.

Of twenty candidate paints, only eight were sufficiently low in lead content to be worth testing. Of these the best three, selected by an exposure test, were used in actual field trials under various conditions. They were Kauri gray Bakelite resin enamel, Duco aluminum paint, and Interior Tank Finish aluminum paint. All three were effective preventives of lead contamination from sap buckets under normal conditions, but proved ineffective under very severe conditions such as allowing the sap to become very sour and stand a long time in the bucket. Before repainting metal buckets, all the old paint should be removed (with hot trisodium phosphate solution); but on wooden buckets, the old paint should be left, except for brushing off loose flakes. If the paints are allowed to cure for at least three weeks they impart no color, flavor or odor to the sap or to sirup made therefrom.

Digest from "Preparation and Painting of Maple-Sugar-Producing Equipment," by C. O. Willits and C. J. Tressler, Jr., *Journal of Agricultural Research* **59**, 151, 1939.

MISCELLANEOUS

Frost-Damaged Grain

BAKING QUALITY of cereal grains is impaired by frost as a result of increased diastatic activity, accompanied by a loss in gluten content and diminished extensibility of the gluten. Among other evidences, the damage is revealed by increased acidity. These changes increase in proportion to the severity of the frost attack.

Much of the loss in quality can be restored by conditioning the frosted grain to inhibit its diastatic activity, improve the properties of the damaged gluten and impart better color to the bread. The best conditioning treatment in such a case is to adjust the moisture content to 16 per cent and heat the grain slowly (over a period of 40 minutes) to 104 deg. F. Lactic acid can also be used to good advantage in restoring lost baking quality to doughs from grain damaged by frost.

Digest from "Biochemical Properties of Frosted Grain," by V. Kretovich and R. Tokareva, Biokhimiya **4**, 68, 1939 (Published in Russia).

Removing Spray Residues

A NOVEL ASSISTANT in baths for washing apples or other fruit to remove traces remaining from insecticidal sprays is disclosed in British Patent 504,417 (granted April 25, 1939, to Robert Zink and assigned to American Cyanamid and Chemical Corp., New York City). The product is a wetting agent and detergent and is effective in removing arsenical and other spray residues. It is made by reaction of a terpene (a readily available terpene is pinene, from turpentine) with a propylphenol or a butylphenol. The product of this reaction is sulphonated, for example by treatment with sulphuric acid. Only a small concentration of the synthetic wetting agent is needed in baths for washing fruit.

Treating Egg Whites

EGG WHITES are improved both in keeping and whipping quality by a treatment disclosed in British Patent 500,800 (granted May 11, 1939, to C. H. McCharles and H. A. Mulvany). The essence of the improvement resides in bringing the albumen to its optimum acidity, at a pH value of approximately 5.8, for a warm vacuum agitation treatment which lessens the acidity till neutrality is reached, or even till the egg white becomes faintly alkaline. The temperature during vacuum agitation is about 122 deg. F., i.e. slightly below the coagulation point. After this preliminary treatment the material may be spray dried, frozen or condensed. In adjusting the acidity, hydrochloric acid (about 0.15 per cent) may be added, or the equivalent quantity of sulphuric or tartaric acid. If more acid is needed it should be added in two or more portions, with heat and vacuum treatment between portions.

Maltose Production

A MALTOSE PREPARATION which is useful in baking, or for fermentation, is disclosed in Swiss Patent 200,989 (granted Jan. 16, 1939, to Patent Co., Ltd. of Vaduz, Liechtenstein). A starch material is first broken down by acid hydrolysis until a considerable proportion of dextrose has been formed. The acid is then neutralized and saccharification is continued with the aid of diastase. Under these conditions the dextrose is recombined to form maltose. When this conversion has been carried to the desired point, the solution is heated to destroy the diastase. The product is a readily filterable solution of sugar, rich in maltose.

Blanching Celery In Storage

THE BEST QUALITY of celery demands a soil with carefully adjusted phosphorus content, but is not so particular with respect to nitrogen supply. There has been a tendency to exaggerate the importance of potassium for celery. Increased yield goes hand in hand with better quality, at least to the extent that the celery has less color, is less pithy and shows less osmotic pressure in the plant cells.

If osmotic pressure is allowed to increase, the stalks take on more color, instead of blanching, and pithiness also increases. Storage behavior is related to the composition of the plant, a factor which emphasizes the importance of adjusting the soil to the needs of the plant. Celery stalks which do not blanch during storage, but remain green, tend on the average to be pithy, contrasted with the crispness of high grade, well blanched stalks.

Digest from "Nutritional Studies of Celery in Relation to Certain Physiological Changes in Cold Storage," by L. F. Ounsworth, *Scientific Agriculture* **19**, 57, 1939 (Published in Canada).

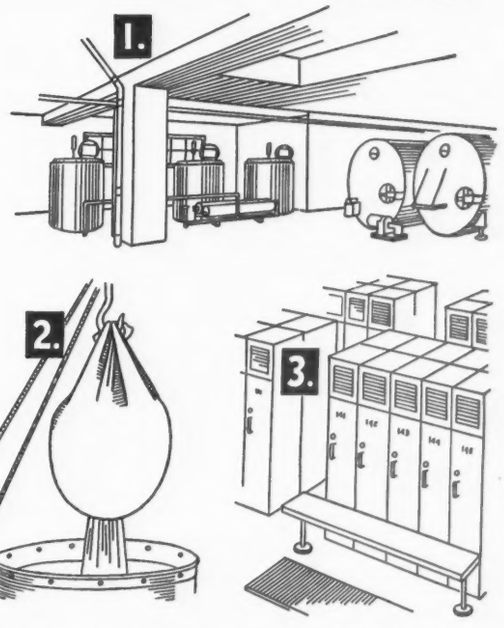
LET HTH PRODUCTS*

Preserve Purity Prevent Spoilage

1. In thousands of dairy plants throughout the country, HTH Products are proving their effectiveness every day in controlling bacteria on equipment of every kind—receiving tanks, holding tanks, filters, coolers, pasteurizers, bottle-fillers, sanitary piping, etc.—and doing it quickly, positively and economically. Bottles, too, are safer when the final rinse solution is made from HTH Products.

2. Cheese bags used to present a difficult problem, but not since cheese plants discovered the effectiveness of HTH Products. Now they simply wash bags in hot water and an alkali cleanser, rinse in warm water, immerse in a 200 p.p.m. solution for a few minutes, then rinse out the remaining chlorine solution. Throughout the plant, too, they use HTH Products for controlling bacteria.

3. Modern food plants not only drill their employees constantly on the necessity of bacteria control in the plant, but maintain a rigid sanitary routine *everywhere* on the premises, including cafeterias, recreation rooms, locker rooms, toilets, etc. And they find HTH Products just as effective for deodorizing and disinfecting in such areas as for bacteria control in the plant itself.



Food and beverage plants find that HTH Products offer an effective means of combatting bacterial contamination that results in a real dollars and cents saving.

Let HTH Products show what they can do in *your* plant. These dependable chlorine sterilizers come to you in powder form, convenient to use.

Added to water, they make quick-acting germicidal hypochlorite solutions of the desired strengths for wiping, flushing or spraying all surfaces with which food or beverage products come in contact. HTH Products are so economical, they may be used freely. They do a thoroughly effective job.

Write today for full information about HTH Products and their use.

HTH PRODUCTS

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42ND STREET, NEW YORK, N. Y.

*HTH PRODUCTS (HTH, HTH-15 and LO-BAX) . . . DRY ICE . . . CARBONIC GAS . . . AMMONIA, ANHYDROUS and AQUA . . . CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . PH-PLUS (FUSED ALKALI)

Formulas for Foods

(*Continued from page 712*)

the mace should be omitted. If part of the shortening is butter, the mace should be cut down accordingly.

Amount of salt used can be varied within limits given to regulate the fermentation to some extent. In warm weather or when the bench work takes more than an hour, the maximum amount should be used. Also, the maximum quantity of salt should be used when the maximum quantity of eggs is used. When butter is used as shortening, the salt should be cut to allow for the salt in the butter.

Sugar yolk may be used instead of whole eggs on the basis of 2 lb. sugar yolk for 3 lb. whole egg. Adjustments for sugar and water will need to be made.

One flour of medium strength may be used instead of the mixture of bread and cake flours.

If lemons are not available for grating, lemon emulsion or lemon oil may be used; lemon oil is the economical form.

THIS IMPROVEMENT

MAKES STERLING DEEP WELL PUMPS

More Trouble Free Than Ever!

Cut-away illustration shows cadmium-plated steel bearing with sintered, graphited liners in place.

NOW, after months of laboratory testing and months of actual proving in the field, Sterling introduces a new drive shaft bearing!

Of cadmium-plated steel shells with sintered, graphited liners, these new Sterling Bearings retain the full tensile strength of the all-bronze bearing plus the added advantage of being lined with the *best possible bearing material!*

And because it is now "steel to steel" in Sterling Pumps, you no longer need to fear the galvanic action between bronze and steel at shaft-enclosing tube joints.

Extra security against scored bearings is another advantage, because the graphited material will run for many hours *without any other lubrication!*

Think of these advantages. Surely they will lead you to ask questions. For further information write, wire or telephone "Pump Headquarters" at once!

PRECISION BUILT

STERLING PUMP CORP., Hamilton, O., Stockton, Cal.

Service (if you need it) From Coast to Coast

There are also Sterling Vertical Centrifugal Pumps, Sterling Sump Pumps, Sterling Propeller and Mixed Flow Pumps, and Sterling Jet Pumps—Precision Built—Yet Cost no More!

The dough should be mixed very slack; much slacker than any bread dough. It will tighten up considerably during fermentation. The more dried milk solids used, the more the dough will tighten up on standing.

The doughs can be mixed by hand or in almost any type of mechanical dough mixer. An upright cake mixer is a convenient type. When the upright mixer is used, the high speed gear should be used after the flour is added. A regular high speed bread-dough mixer can be used if the sweet dough batch is sufficiently large. Dough should not be mixed too long in any type of high speed mixer.

When the dough is mixed by hand or in a slow speed mixer, the dry milk solids work better when dissolved in the water instead of being sifted dry into the flour. For this purpose use one third of total water, place milk on top of water, and beat in with a baker's whip. The yeast may be broken up and suspended in the same water. The water should not be hot nor cold if the yeast is to be suspended in it.

If dough can be worked up immediately let it ferment about two hours before punching down. Let set 15 to 20 minutes before taking to bench. Work off of bench in 45 to 60 minutes. If fermentation period is only one and one-half hours for two-thirds rise, the bench time can be increased to one and one-half hours. Shop temperature will determine the time when dough is ready for the punch. At times, the dough should not be punched but taken directly to the bench. Knock dough down on bench and allow to recover while preparations are made to work it up.

Basic sweet doughs may be used for about 50 bake shop products.

Formula from Dry Milk Institute

FORMULA NO. 28

Maple Walnuts (Imitation Maple)

Sugar	**300 lb.**
Water	**20 gal.**
Benzoate of soda (dry, dissolved in 1 quart of hot water)	**6 oz.**
Maple flavor, made after Sale & Wilson (U. S. D. A.)	**7 lb.**

Heat to 219 deg. F.

Production = 46 gal.

Working Directions

Manchurian walnuts are usually used. Sort and cut walnuts to any

desired size, usually ¼-inch. Sift out chaff. Pack walnuts into jars and cover with the sirup. Close. Heat in water bath at 180 deg. F. for 30 minutes.

Formula from David Algie

FORMULA NO. 29

White Cake Made with Lard

Part	Ingredient	Amount, gm., oz. or lb.
1	Cake flour	50
	Lard	40
2	Egg whites	50
3	Sugar	75
	Salt	4
4	Milk	90
	Vanilla	2
5	Cake flour	50
	Sugar	50
	Baking powder	4.5
Total		415.5

Working Directions

1. Blend Part 1 until very soft and smooth (about 5 minutes).
2. In a separate bowl, beat Part 2 on high speed until it begins to stiffen. Reduce speed to medium, continue beating, and add Part 3. Beat until as stiff as possible. Set aside.
3. Return Part 1 to the machine and add Parts 4 and 5 to it alternately in three or four additions, beginning and ending with liquid. Mix until smooth. Scrape as needed.
4. Add the beaten eggs (Part 2) to the batter and work in by machine on first speed for 1–2 minutes, scraping down once.
5. Bake at 360–375 deg. F.

Formula from Institute of American Meat Packers.

FORMULA NO. 30

Prepared Pancake Flour (Home Type)

Flour (general purpose type)	100 lb.
Soda (sodium bicarbonate)	2 lb.
Mono-calcium phosphate	2½ lb.
Flour salt	2 lb.
Dextrose (corn sugar)	3–5 lb.
Powdered whole egg	3 lb.
Shortening (dry or plastic)	10–15 lb.
Dry milk solids	5–3 lb.

Weights of corn sugar and milk solids used should total 8 lb. for each 100 lb. of flour used.

Mix flour and soda for 2 or 3 minutes before adding remainder of dry ingredients. Continue mixing to make total time of 20 minutes.

If dry shortening is used, a total mixing time of 20 minutes is sufficient. Horizontal ribbon type mixer is generally used.

If plastic shortening is used, add shortening at the end of the 20 minutes mixing period and continue mixing for 45 minutes in horizontal ribbon type mixer. In trowel type mixer, continue mixing for 8 to 12 minutes depending upon consistence of shortening and mixing room temperature. In horizontal ribbon type mixer strung with cutting wires, continue mixing for 25 to 30 minutes.

Do not continue mixing beyond period necessary to get uniform and homogeneous distribution of the shortening.

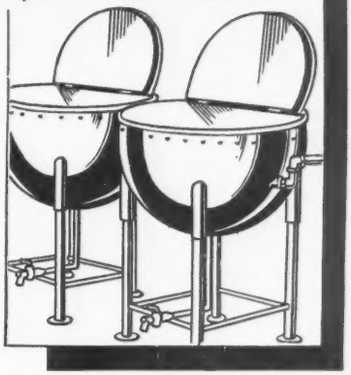
Formula from Dry Milk Institute

Two more TOUGH Cleaning Problems MADE EASY with Oakite Cleaning

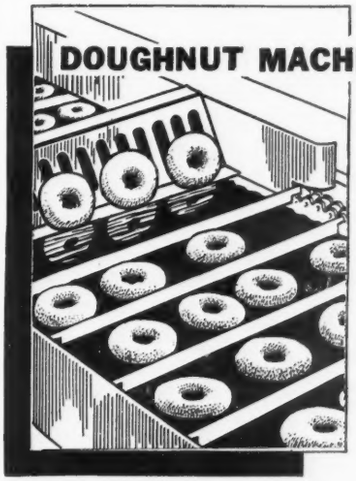
CLEANS KETTLES BETTER, AT LESS COST

Removing heavy, sticky deposits of chocolate mix from steam jacketed kettles had long been a troublesome job in one Eastern plant. But how different everything is now!

By circulating the recommended Oakite solution for thirty minutes, following with a thorough rinse, the tenaciously adhering accumulations are completely removed. Kettles are as clean as the proverbial pin . . . metal is neither harmed nor discolored. Equally important, cleaning costs are lower than heretofore, as smaller amounts of the Oakite material do the work with complete satisfaction.



DOUGHNUT MACHINES CLEANED QUICKLY



In many baking establishments, cleaning doughnut machines no longer requires the tedious, time-consuming manual effort formerly needed. By using new, improved Oakite materials and methods developed especially for this work, these plants find that burned-on dough, fat, grease and oil are removed with new speed, new thoroughness. Because cleaning is easier, results are better . . . considerable time and effort saved.

No matter what your sanitation problems, Oakite cleaning and sterilizing materials can help you improve results and save money. Have our nearby Service Representative call, or write for helpful data. No obligation.

Manufactured only by
OAKITE PRODUCTS, Inc., 26G Thames St., New York, N.Y.
Representatives in All Principal Cities of the U. S.

OAKITE CERTIFIED CLEANING
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

BOOKS RECEIVED

Developments in Packaging

RECENT DEVELOPMENTS IN PACKAGING PROGRESS. By H. J. Higdon, Harry Carlton and Alan S. Cole. Published by American Management Association, 330 W. 42nd St., New York, N.Y., 1939. 32 pages; 6x9 in.; paper. Price, 50 cents.

One of the most common fallacies having to do with packaging is that everybody thinks he knows something about it, and that business men who wouldn't think of doing their own plumbing, bricklaying or hair cutting are constantly attempting to design their own packages. This is the type of serviceable suggestion presented in the article on packaging fallacies, the first of three parts of this pamphlet.

The second section "Packaging and Merchandising Frozen Foods" gives much basic information on how quick-frozen foods are packaged, with something about costs, volumes and rates of freezing.

The third section discusses laminated packaging materials and hints at their possibilities.

Putting Vitamin D in Milk

THE IRRADIATION OF MILK. Research Bulletin 136. By K. G. Weckel and H. C. Jackson. Published by Agricultural Experiment Station of the University of Wisconsin, Madison, 1939. 55 pages; 6x9 in.; paper. Free.

Within the pages of this bulletin is presented a summary of the present knowledge on the process of irradiating milk to introduce vitamin D. The bulletin covers all aspects of irradiation, both theoretical and practical, with emphasis on irradiating equipment and methods. There are 85 references to literature on irradiation at the end of the bulletin.

Miscellaneous

AMERICAN STANDARD CODE FOR MECHANICAL REFRIGERATION. Published by American Society of Refrigerating Engineers, 37 W. 39th St., New York, N. Y., 1939. 14 pages; 8½ x 11 in.; paper. Price, 20 cents.

Every user of mechanical refrigeration should have a copy of this code so that he may benefit by following its specifications as to installation and operation of equipment.

MANUAL OF SUGAR COMPANIES 1939. Published by Farr & Co., 90 Wall St., New York, N. Y. 180 pages; 5¼ x 8 in.; paper. Price, $1.

In this little edition is a wealth of statistical information on the sugar industry. There are facts about the sugar companies and statistical tables of sugar production, yield, prices, distribution, exports, imports, consumption and so forth. Then the quotas for 1938 and 1939 are given. A special feature of this edition is a historical and descriptive outline of the beet sugar industry, with a list of factories and data about them.

INDUSTRIAL MARKET DATA HANDBOOK OF THE UNITED STATES. By O. C. Holleran. Published by the United States Department of Commerce. Washington, D. C., 1939. 907 pages; 9½ x 11¾ in.; cloth. Price, $2.50.

Since this is a guidebook to industrial markets, it is of limited value to producers of consumer goods. It does, however, give a comprehensive picture of the industrial market, and hence the degree of industrialization, of each of the 3,070 counties in the

Reduce YOUR MIXING COSTS THE SANITARY "LIGHTNIN" WAY

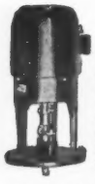
Replace Paddle Type Agitators

It has been repeatedly proved that LIGHTNIN Patented Double Action Propeller Type Mixing cuts power costs, reduces mixing time and entirely eliminates dead-spots. Complete line includes geared and direct drive portables, top entering and side entering mixers for mixing quantities from one to one million gallons.

Completely sanitary. No pockets for bacteria. Easily cleaned with hot water or steam. Sanitary sealed out-board bearing prevents oil or grease from this source contaminating mix.

"Lightnin" Variable Speed Mixers operate from 100 to 1800 R. P. M.

"Lightnin" Portable Mixers (geared and direct drive) range in size from 1/30 to 10 H. P.



"Lightnin" Top Entering Units (geared and direct drive) for open or closed tank work including pressure and vacuum work.

"Lightnin" Side Entering Units for tanks up to 1,000,000 gals.

"LIGHTNIN" SAVES MONEY MIXING

Carbonated Beverages
Tomato Products
Fruit Juices—Jellies—Jams
Preserves—Lard—Milk
Ice Cream Mix—Milk Drinks
Buttermilk—Bakery Supplies
Soups—Brines—Syrups
Vinegar—Wines
Yeast Products—Flavorings
Fruit Pulp—Extracts
Vegetable Dyes—Baby Foods
Premixing Mayonnaise and Salad Dressings
Sherbet—Honey
Beer—Distilled Spirits
Meat Sauces—Vegetable Oils
Vegetable Butters
Mincemeat—Cod Liver Oil

MIXING EQUIPMENT CO., INC.
1043 Garson Ave., Rochester, N. Y.
Please send me:
☐ Bulletin B-65—Portable Mixer.
☐ Bulletin B-63—Top Entering Mixer.
☐ Bulletin B-62—Side Entering Mixer.
☐ Mixing Equipment Work Sheet.
Name_____
Title_____
Company_____
Address_____

MIXING EQUIPMENT CO., INC.
1043 Garson Ave., Rochester, N, Y.

MANUFACTURERS OF LIGHTNIN PROPELLER TYPE MIXERS

United States, and similar data for every city of more than 10,000 population. This information will be of some assistance in measuring the calibre of the consumer market.

Controlling Quality

FOOD CONTROL: ITS PUBLIC HEALTH ASPECTS. By James Houston Shrader. Published by John Wiley & Sons, Inc., 601 West 26th St., New York, N.Y., 1939. 513 pages; 6¼x9¼ in.; cloth. Price, $4.

Food technologists constantly face the important problem of so controlling processing, storage, shipping and handling conditions as to protect the health of consumers. In addition, they have the task of controlling quality for sake of quality alone. So this book should be helpful.

Several chapters in the first part of the book discuss principles in general. Then follow chapters on each of the classes of foods which have been found to have an important bearing on public health. Each class of food is considered from the standpoint of technology, relation to the public health and regulatory control. The material presented is of such a form that it can be used in a practical way.

Text of New Food Law

FEDERAL FOOD, DRUG AND COSMETIC ACT AND GENERAL REGULATIONS FOR ITS ENFORCEMENT. Published by United States Department of Agriculture, 1939. 50 pages; 6x9¾ in.; paper. Price, 10 cents; for sale by Superintendent of Documents, Washington, D.C.

This is a pamphlet that should be in the library of every food company. It contains the text of the new food, drug and cosmetic law, as amended, and general regulations for its enforcement. It contains also the texts of the acts of July 24, 1919, March 4, 1923, and August 27, 1935, respectively, defining wrapped meats as in package form, defining butter and providing a standard therefor and providing for the inspection of seafood.

Progress in Biochemistry

ANNUAL REVIEW OF BIOCHEMISTRY, VOLUME VIII, 1939. James Murray Luck, editor. Published by Annual Reviews, Inc., Stanford University, P.O., Calif. 676 pages; 6½x9 in.; cloth. Price, $5.

Representing as it does a survey of the progress of investigation in the whole field of biochemical endeavor, this annual volume is valuable in keeping up to date technologists engaged in biochemical work. Among the 25 subjects treated in the review are some of particular interest to the food technologist; biological oxidations and reductions, proteolytic enzymes, the chemistry of proteins and amino acids, carbohydrate metabolism, metabolism of proteins and amino acids, the water-soluble vitamins, fat-soluble vitamins and the biochemistry of yeast.

Effects of Price Control

PRICE CONTROL UNDER FAIR TRADE LEGISLATION. By Ewald T. Grether. Published by Oxford University Press, 114 Fifth Ave., New York, N.Y., 1939. 517 pages; 5¾x8¾ in.; cloth. Price, $5.

What loss-leader selling may produce in terms of profit losses is cited in hypothetical cases in the chapter of this book covering leaders and loss leaders. What happened in actual cases of price control in the food industries is reviewed in a chapter on "The Food Trades." This is practical case history data. These are some of the highlights in a book reviewing and summarizing the experience in the United States with price-control legislation in the distributive trades.

The book is written in three parts. Part one has to do with the legal setting; part two, experience in California; part three, general and interpretive information. In the appendix is a summary of general state laws dealing with the control of competition in price.

Informative Labeling

PROBLEMS UNDER INFORMATIVE LABELING. By F. S. Blanchard, Harold Brightman, and Esther Cole Franklin. Published by American Management Association, 330 West 42nd St., New York, N.Y., 1939. 23 pages; 6x9 in.; paper. Price, 50 cents.

The pros and cons of informative labeling are presented from three viewpoints: that of the manufacturer, that of the retailer, and that of the consumer. Each of the three authors is well qualified to present their case.

PATENTS

Milk Packaged in Fiber Containers Dipped Into Heated Paraffin and Subsequently Sterilized by Filling With Liquid Bactericide, Emptying and Sealing Preliminary to Shipment to Milk Bottling Plants—John M. Hothersall, Brooklyn, N. Y., to American Can Co., New York, N. Y. No. 2,174,514. Oct. 3, 1939.

Yeast Activity in Dough Stimulated by Addition of Small Amount of Ethanolamine—Roger J. Williams, Corvallis, Ore., to Standard Brands Inc., New York, N. Y. No. 2,174,543. Oct. 3, 1939.

Potato Chips Cooked in a Continuous Manner During Passage Through Deep Fat Whose Temperature is Highest at Feed End—Joseph D. Ferry, Harrisburg, Pa.; Sylvia O. Ferry, executrix. Nos. 2,174,555 and 2,174,556. Oct. 3, 1939.

Bulging, Buckling, and Bursting of Food Containing Cans During Sterilization Prevented by Filling Loaded Sterilizing Equipment With Water to Give the Same Filled and Unfilled Space Ratio in the Apparatus as Exists in the Containers and Rotating Sterilizing Equipment During Heating at Sterilizing Temperature — Herman Heuser, Evanston, Ill. No. 2,174,659. Oct. 3, 1939.

Fermented Grape Pomace Ground to Liquid State Preliminary to Passage Through Continuous Still for Recovery of Alcohol Content—Enrico Prati, Asti, Calif. No. 2,174,707. Oct. 3, 1939.

Milk Products Containing Alpha and Beta Lactose Anhydride Stabilized Against Hygroscopicity—Faw Yap Chuck, San Francisco, Calif. No. 2,174,734. Oct. 3, 1939.

Meat Pickled in Vat Equipped With a Return Flow Conduit for Circulation of Pickling Liquid — George A. Hormel, Los Angeles, Calif., to George A. Hormel & Co., Austin, Minn. No. 2,174,746. Oct. 3, 1939.

Bread Dough Made by Making Sponge of All Non-Flour Ingredients Plus 20 Per Cent of the Total Amount of Flour and Mixing Until Yeast is Distributed Uniformly Throughout the Sponge Before Remaining 80 Per Cent of Flour is Added — Clotilde Swartout, North Muskegon, Mich. No. 2,174,807. Oct. 3, 1939.

Sweet Potatoes Stabilized in Moisture Content by Drying at 50 to 75 Deg. F., Moistening Surface With Water and Thin Film of Transparent Non-Volatile Edible Oil and Drying Out the Surface Moisture to Leave Oil Film—Albert T. Repp, Swedesboro, N. J. No. 2,174,838. Oct. 3, 1939.

Dressed and Drawn Poultry Packaged in Transparent Seamless Tubing Shrunk to Fit Contour of Carcass and Tightly Closed at Both Ends Preliminary to Freezing of Carcass in Tubing — Harry R. McCleary, St. Louis, Mo., to Sylvania Industrial Corp., Fredericksburg, Va. No. 2,174,924. Oct. 3, 1939.

Flaked Cereal Products Made by Treating Hulled Cereal With Malt to Convert Starch, Holding at 148 to 170 Deg. F. in Wort Containing Flavoring Material for Three Hours, Cooking and Flaking—John L. Kellogg, to New Foods Inc., Chicago, Ill. No. 2,174,982. Oct. 3, 1939.

Candy Canes Made by Mechanical Means—Clarence C. Page, to William B. and M. H. Wright Candy Co., Portland, Ore. No. 2,175,089. Oct. 3, 1939.

Bread Dough Twisted Mechanically — Bert Austin Howe, Tucson, Ariz. No. 2,175,119. Oct. 3, 1939.

Flour Bleached by the Reaction Between Sulphur Trioxide and the Nitrite of an Alkali Metal—Souren Z. Avedikian, New York, N. Y. No. 2,175,172. Oct. 10, 1939.

Foods Frozen in a Room Supplied With Air From Refrigerated Coils in a Casing Through Which Blast is Blown—Claude A. Bulkeley, New York, and Martin H. Olstad, Bayside, N. Y., to Niagara Blower Company, New York, N. Y. No. 2,175,176. Oct. 10, 1939.

Eggs Candled Through The Aid of Mechanical Means—Raymond R. Haugh, to Kraft-Phenix Cheese Corp., Chicago, Ill. No. 2,175,262. Oct. 10, 1939.

Ground Meat Forced Through a Casing or Can Filling Orifice by Caterpillar Tread-Like Surfaces Operating Through a Vertical Plane—August J. Meyer, Oak Park, Ill., one-half to Alvin D. Blieden, Chicago, Ill. No. 2,175,275. Oct. 10, 1939.

Beer Given a Vitamin D Content by Addition of an Oil-Free Alcohol Solution of Vitamin D Concentrate—Jacques W. D. Chesney, to New Discoveries, Inc., Chicago, Ill. No. 2,175,340. Oct. 10, 1939.

Sheep and Lamb Carcasses Freed From Air and Water Between Fell and Flesh by Pressure Rubbing Before Refrigeration—Herman H. Hazekamp, to Armour & Co., Chicago, Ill. No. 2,175,352. Oct. 10, 1939.

Frozen Fish Covered With Transparent Ice Glaze Given Non-Cracking Characteristics by Water Soluble Alcohols—Robert Henry Bedford, Prince Rupert, British Columbia, Canada. No. 2,175,680. Oct. 10, 1939.

Foods Protected Against Loss of Natural Color During Cooking by Mixture of 5 Per Cent Sodium Bicarbonate, 7 Per Cent Anhydrous Trisodium Phosphate, 10 Per Cent Anhydrous Sodium Sulphate and 78 Per Cent Sodium Chloride—Frederick Craig Ewan Harry, Maroubra, and Henry Herbert York, Killara, Australia, to Chemtex Ltd., Alexandria, near Sydney, New South Wales, Australia. No. 2,175,955. Oct. 10, 1939.

Sugar Mush Centrifuged at Between 170 and 195 Deg. F. to Remove 85 Per Cent of Mother Liquor at 1,250 r.p.m. Within 40 Sec. Before Washing With Water in a Mist-Like Spray at a Temperature in Excess of 170 Deg. F.—Eugene Roberts, Hastings, N. Y., to Western States Machine Co., New York, N. Y. Nos. 2,175,995 and 2,175,996. Oct. 10, 1939.

Sugar Mixed With Sugar Sirup Heated to Temperature Above 160 Deg. F. Preparatory to Centrifuging at a Higher Temperature but Below Carmelization for Removal of Excess Sirup to be Heated and Reused—George E. Stevens, Denver, Colo., to Western States Machine Co., New York, N. Y. No. 2,175,998. Oct. 10, 1939.

Materials Containing a Glyceride Fat or Oil Mixed With Less Than 5 Per Cent of an Unbleached Oat, Corn or Barley Flour to Retard Rancidity—Sidney Musher, to Musher Foundation Inc., New York, N. Y. No. 2,176,022. Oct. 10, 1939.

Ice Cream Containing Butter Fat Stabilized Against Rancidity by Addition of Less Than 2 Per Cent Finely Divided Unbleached Cereal—Sidney Musher, to Musher Foundation Inc., New York, N. Y. No. 2,176,023. Oct. 10, 1939.

Butter and Ice Cream Containing Butter Fat Made Resistant to Rancidity by Addition of Less Than 2 Per Cent Finely Divided Oil-Free Seed Residue—Sidney Musher to Musher Foundation Inc., New York, N. Y. No. 2,176,024. Oct. 10, 1939.

Animal Hides Giving a Two-Step Treatment With Salt in Which the First Step Involves the Use of a Small Amount of a Cereal Flour—Sidney Musher, to Musher Foundation Inc., New York, N. Y. No. 2,176,025. Oct. 10, 1939.

Foods Subject to Rancidity Stabilized by Addition of Small Amount of Water-Alcohol Extract of a Finely Divided Unbleached Cereal—Sidney Musher to Musher Foundation Inc., New York, N. Y. No. 2,176,026. Oct. 10, 1939.

Water Containing Foods Subject to Oxidative Deterioration Stabilized by Less Than 5 Per Cent of a Water Soluble Extract of Finely Divided Unbleached Cereal—Sidney Musher to Musher Foundation Inc., New York, N. Y. No. 2,176,027. Oct. 10, 1939.

Meat and Fish Stabilized Against Rancidity by Treatment With Water—Alcohol Extract of Finely Divided Unbleached Cereal—Sidney Musher to Musher Foundation Inc., New York, N. Y. No. 2,176,028. Oct. 10, 1939.

Foods Subject to Oxidation Treated With an Antioxygenic Alcoholic Extract of Cereal Flour With a Phospholipins Content of Less Than 0.5 Per Cent—Sidney Musher to Musher Foundation Inc., New York, N. Y. No. 2,176,029. Oct. 10, 1939.

Glyceride Oils Stabilized Against Rancidity by Addition of Less Than 5 Per Cent Alcohol Soluble Extract of a De-Oiled Antioxygenic Seed—Sidney Musher to Musher Foundation, Inc., New York, N. Y. No. 2,176,030. Oct. 10, 1939.

Edible Glyceride Oil Made to Contain Less Than 5 Per Cent of Finely Divided De-Fatted Cocoa Bean Residue—Sidney Musher to Musher Foundation Inc., New York, N. Y. No. 2,176,031. Oct. 10, 1939.

Crude Cane and Beet Sugar Containing 90 Per Cent Water Soluble Carbohydrates Added as Stabilizer to Foods Subject to Oxidative Deterioration—Sidney Musher to Musher Foundation Inc., New York, N. Y. No. 2,176,033. Oct. 10, 1939.

Foods Subject to Rancidity Deterioration Stabilized by Addition of Crystallized Sugar and Water Extract of De-Fatted Unbleached Cereal Flours—Sidney Musher to Musher Foundation, Inc., New York, N. Y. No. 2,176,034. Oct. 10, 1939.

Sugar Preparation Having Antioxygenic Properties Made From a Water Soluble Carbohydrate and Water Soluble Antioxygens Extracted From Finely Divided Seeds—Sidney Musher to Musher Foundation, Inc., New York, N. Y. No. 2,176,035. Oct. 10, 1939.

Salt Preparation Having Antioxygenic Properties Consisting of Common Salt and Water Soluble Antioxygens Extracted From Finely Divided Unbleached Cereals—Sidney Musher to Musher Foundation, Inc., New York, N. Y. No. 2,176,036. Oct. 10, 1939.

Rancidity Inhibiting Agent Made From Cereals and Seeds and a Small Amount of an Extract of Unbleached Finely Divided Cereals—Sidney Musher to Musher Foundation, Inc., New York, N. Y. No. 2,176,037. Oct. 10, 1939.

Fat-Free Casein and Albumen Proteins Subject to Decomposition Stabilized by Addition of Finely Divided Unbleached Cereals and Seeds or a Starch-Oil-Fibre Free Carbohydrate With Water and Alcohol Soluble Antioxygens—Sidney Musher to Musher Foundation, Inc., New York, N. Y. No. 2,176,038. Oct. 10, 1939.

Cake of Angel Food Type Made to Contain Small Portion of Reaction Product of Tetra-Phosphoric Acid With Four or More Carbon Atom Alcohol to Increase Lightness—Morris B. Katzman, to Emulsol Corp., Chicago, Ill. No. 2,176,077. Oct. 17, 1939.

Egg Whites Given Increased Leavening Qualities by Addition of Small Proportions of a Reaction Product of Tetra-Phosphoric Acid and a Four or More Carbon Atom Alcohol—Morris B. Katzman, to The Emulsol Corp., Chicago, Ill. No. 2,176,078. Oct. 17, 1939.

Cake of Angel Food Type Made to Contain Small Proportion of a Reaction Product of Poly-Phosphoric Acid With A Four or More Carbon Atom Alcohol—Morris B. Katzman, to Emulsol Corp., Chicago, Ill. No. 2,176,079.

Egg Whites Given Increased Leavening Properties By Addition of Reaction Product of a Poly-Phosphoric Acid With an Alcohol—Morris B. Katzman, to Emulsol Corp., Chicago, Ill. No. 2,176,080. Oct. 17, 1939.

Meat Cured by Treating With Hydrogen Peroxide After Pickling With Salt and Dextrose and Washing—Meyer Moskowitz, New York, N. Y., and Harry Meisel, North Bergen, N. J., to Corn Products Refining Co., New York, N. Y. No. 2,176,144. Oct. 17, 1939.

Potatoes Given 72 Hour Treatment by Soaking in Solution Containing Acetic Acid, Citric Acid, and Sodium Chloride—Edward G. Jansen, Sheboygan, Wis. No. 2,176,347. Oct. 17, 1939.

Ice Cream or Frozen Custard Confection on Stick Given a Thin Covering of Coating Applied by Pressure Molds—Ezra Moroni Peterson, Ogden, Utah. No. 2,176,408, and No. 2,176,409. Oct. 17, 1939.

Potato Slices Propelled Through Deep Fat Cooking Vat to Give Uniform Cooking Into Potato Chips—Joseph D. Ferry, Harrisburg, Pa.; Sylvia O. Ferry, Executrix. No. 2,176,624. Oct. 17, 1939.

Fish Frozen in Two Layers in Pan With Metal Plate Separating Layers—George L. Gross, to Northern Cold Storage and Warehouse Co., Duluth, Minn. No. 2,176,764. Oct. 17, 1939.

Glutamic Acid Made by Hydrolyzing Wheat Gluten With Hydrochloric Acid—Géza Braun to Standard Brands Inc., New York, N. Y. No. 2,176,785. Oct. 17, 1939.

Foods in Containers Cooked in a Rotatable Retort Equipped With a Plurality of Retort Tubes—Herbert Dan Galvin to L. C. Engineering Supplies Ltd., New Malden, England. No. 2,176,811. Oct. 17, 1939.

Canned Foods Delivered From Cooker Retort to Cooler by a Rotary Valve Device Without Loss of Pressure in Retort—Thomas Marsden Jones, to Mather & Platt Ltd., Newton Heath, Manchester, England. No. 2,176,818. Oct. 17, 1939.

Excess Fat Removed From Deep Fat Fried Foods by Mechanical Means—Kenneth E. Bemis, Oakland, Calif. No. 2,177,166. Oct. 24, 1939.

Fresh Meat Stabilized in Natural Color by Use of an Alkali Metal Aluminate to Give a pH of Approximately 7.0 to 7.4—James J. Doyle, Chicago, Ill. No. 2,177,519. Oct. 24, 1939.

Corn Gluten Hydrolyzed to Give Recoverable Amino Acids Leucine and Tyrosine—Arthur Maurice Mark, Argo, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,178,210. Oct. 31, 1939.

Dustless Grits Made From Corn Starch—William John Lauterback, Pekin, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,178,235. Oct. 31, 1939.

Open Type Pretzels Made by Extruding Dough Through Die—Harry A. Orr, Cleveland, Ohio, to The Victor Development and Patent Co. No. 2,178,431. Oct. 31, 1939.

Sugarless Gelatin Mixture Made to Contain 7 to 12 Grams of Gelatin 0 to 1.5 Grams of Fruit Acid, and 7.5 to 3.5 Grams of Mixed Sodium Potassium and Ammonium Salts of Fruit Acids—Llewellyn R. Ferguson, LeRoy, N. Y., to General Foods Corp., New York, N. Y. No. 2,178,569. Nov. 7, 1939.

Papaya Concentrate Made From the Extracted Fruit Juice and Weak Acid Extract of the Seed—Leroy Leon Matoush, to Papaya Corp. of America, New York, N. Y. No. 2,178,593. Nov. 7, 1939.

Liquids Heat-Treated in Vats Equipped With Coil Centered on a Rotatable Axis and a Stationary Baffle Supported Within Coil—Fritz G. Cornell, Jr., Montain Lakes, N. J., to Jensen, Creamery Machinery Co., Inc., Bloomfield, N. J. No. 2,178,661. Nov. 7, 1939.

Butter and Margarine Chilled on a Refrigerated Cylindrical Drum Surface and Removed in a Slab-Like Form—Charles Doering, one-half to Henry Doering, Chicago, Ill. No. 2,178,780 and No. 2,178,781. Nov. 7, 1939.

Sugar-Containing Materials Heat-Treated in Receptacle Fitted With a Stirring Device Constructed and Arranged to Give Temperature Differences Between the Various Parts Substantially in Proportion to Their Different Rates of Linear Motion During Stirring—Charles A. Olcott, West Milford, N. J. No. 2,178,805. Nov. 7, 1939.

Baked Goods Leavened by the Action Between 30 Per Cent Hydrogen Peroxide Solution and Yeast at a pH of 6.5 to 8.5—Jacob Freilich, New York, and Charles N. Frey, Scarsdale, N. Y., to Standard Brands Inc., New York, N. Y. No. 2,178,959. Nov. 7, 1939.

Potato Slices For Chip Making Washed Free From Water Solubles and Adhering Shreds During Passage Through Perforated Cylinder Submerged in Counter-Flowing Water—Joseph D. Ferry, Harrisburg, Pa.; Sylvia O. Ferry, Executrix. No. 2,179,035. Nov. 7, 1939.

Fish Meat Hunks Smoked in a Two-Step Method with Coating of Oil Following Each Step—Roy Gamble, Tacoma, Wash. No. 2,179,122. Nov. 7, 1939.

Cocoa Flavored Mixture Made by Mixing Dry Powdered Cocoa Into a High Purity Dextrose Sirup Heated to Between 230 and 280 deg. F., Running Into a Mold To Cool, Grinding and Sifting Through a 30 Mesh Screen—Herbert T. Middleton, Englewood, N. J., to Corn Products Refining Co., New York, N. Y. No. 2,179,130. Nov. 7, 1939.

Malt-Like Sirup Made From Corn Steep Water and Corn Sirup—Leo Stein, East Orange, N. J., and James F. Walsh and Haskell C. Needle, Chicago, Ill.; Walsh and Needle rights to American-Maize-Products Co. No. 2,179,203. Nov. 7, 1939.

Multi-Flavored or Composite Frozen Confections Formed Like Suckers on a Stick—Jorman M. Thomas, Pelham, N. Y., to Joe Lowe Corp., New York, N. Y. No. 2,179,225. Nov. 7, 1939.

Biscuits and Cookies Made on an Endless Band Conveyor Oven Equipped With Baffles Along Edges of the Conveying Lap of Band—Claude Dumbleton, Peterborough, England, to Baker Perkins Co., Inc., Saginaw, Mich. No. 2,179,253. Nov. 7, 1939.

UNITED STATES DEPARTMENT OF AGRICULTURE

Agricultural Marketing Service

TENTATIVE UNITED STATES STANDARDS FOR GRADES OF

FROZEN LIMA BEANS

(EFFECTIVE SEPTEMBER 15TH, 1939)

DEFINITION

FROZEN LIMA BEANS are the vegetable prepared from the seed of varieties of the South American Lima Bean (*Phaseolus Lunatus*) by shelling and thorough washing, with or without grading as to size, with proper pre-cooking (blanching) and are frozen and stored at temperatures necessary for the preservation of the product.

GRADES OF FROZEN LIMA BEANS

»» ***U. S. GRADE A or U. S. Fancy frozen Lima beans*** are Lima beans of similar varietal characteristics, are uniformly green in color and do not contain in excess of 3 per cent by count of white Lima beans; conform to the size, or combination of sizes claimed for the Lima beans; are reasonably free from loose skins and broken beans and practically free from other defects; are tender, possess a normal flavor and odor and score not less than 90 points when scored according to the scoring system outlined herein.

»» ***U. S. GRADE B or U. S. Choice frozen Lima beans,*** are Lima beans of similar varietal characteristics; not less than 50 per cent of the beans are green in color; conform to the size or combination of sizes claimed for the Lima beans; are reasonably free from loose skins and broken beans and are reasonably free from other defects; are reasonably tender, possess a normal flavor and odor, and score not less than 75 points when scored according to the scoring system outlined herein.

»» ***U. S. GRADE C or U. S. Standard frozen Lima beans*** are Lima beans of similar varietal characteristics; may consist of all white or mixed white and green beans; conform to the size or combination of sizes claimed for the Lima beans; are fairly free from loose skins and broken beans and other defects; are fairly tender, possess a normal flavor and odor, and score not less than 60 points when scored according to the scoring system outlined herein.

»» ***OFF-GRADE Quality (Substandard) frozen Lima beans*** are Lima beans which fail to meet the requirements of the foregoing grades, or when any one of the grading factors is scored in the subdivision D.

NOTE: Condition and quality of the frozen Lima beans as outlined in these grades will be determined immediately after thorough thawing in tap water at room temperature (approximately 68 deg. F.).

DEFINITION OF SIEVE SIZES

When graded for size, a tolerance of 5 per cent by count will be allowed for variations incident to commercial grading and handling.

No. 1 size Lima beans are beans that will pass through a sieve containing 28/64-inch perforations.

No. 2 size Lima beans are beans that will pass through a sieve containing 30/64-inch perforations, but will not pass through a sieve containing 28/64-inch perforations.

No. 3 size Lima beans are beans that will pass through a sieve containing 34/64-inch perforations, but will not pass through a sieve containing 30/64-inch perforations.

No. 4 size Lima beans are beans that will not pass through a sieve containing 34/64-inch perforations.

EXPLANATION OF TERMS

As used in these grades:

"Normal flavor and odor" means that the Lima beans are free from objectionable or off flavors and odors of any kind.

"Broken beans" means that the Lima bean is so damaged that a cotyledon or portion thereof has become separated from the bean.

CONDITION OF PACKAGE AND LABEL

Containers shall be sound and clean. If labeled, the labels on the container and package shall be clean and shall be neatly and securely affixed and shall comply in all respects with the requirements of the Federal Food, Drug and Cosmetic Act.

ASCERTAINING THE GRADE

The grade of frozen Lima beans may be ascertained by considering the following factors: Color, absence of defects, and tenderness and maturity. The relative importance of each factor has been expressed numerically on a scale of 100. The maximum number of credits which may be given for each factor is:

		Points
I.	**Color**	**30**
II.	**Absence of defects**	**20**
III.	**Tenderness and maturity**	**50**
	Total	**100**

ASCERTAINING THE RATING OF EACH FACTOR

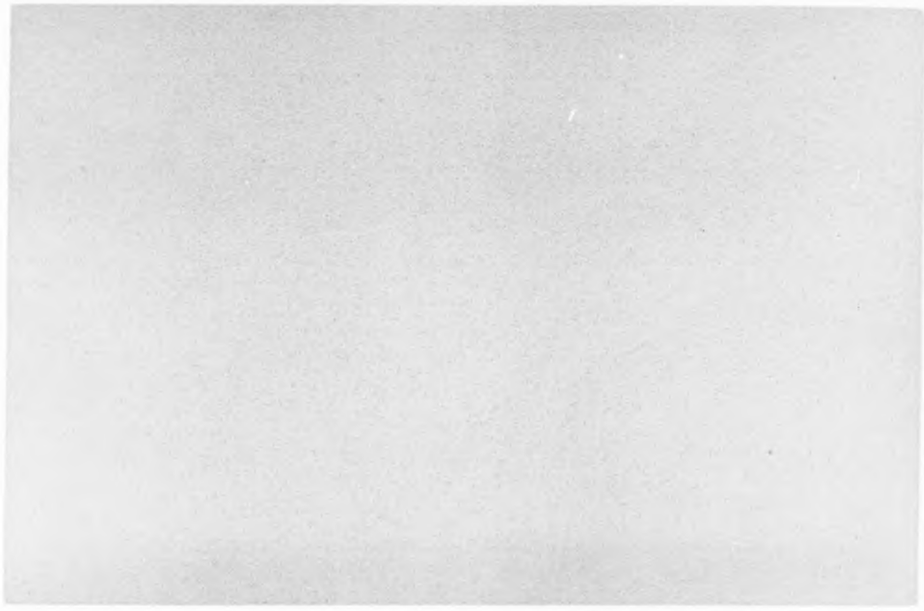
I. COLOR

(A) Lima beans that are practically uniform green in color containing not more than 3 per cent by count of "white Lima beans" may be given a credit of 27 to 30 points. Lima beans that fail to meet this requirement shall not be graded above U. S. Grade B or U. S. Choice, regardless of the total score for the product.

(B) If the Lima beans are variable in color, containing not more than 50 per cent by count of white Lima beans, a credit of 22 to 26 points may be allowed.

(C) If more than 50 per cent of the Lima beans are "white," a credit of 15 to 21 points may be allowed.

(D) If the Lima beans are markedly of poor color, from 0 to 14 points may be allowed.



NOTE—*"Green in color" means that the Lima beans with skins removed possess as much or more green than plate 18-K-3. "White Lima Beans" are Lima beans with skins removed showing less green than plate 18-K-3. (Color as illustrated in Maerz and Paul "Dictionary of Color.")*

»» II. ABSENCE OF DEFECTS

(A) Lima beans that contain not more than 1 per cent by count of spotted or off colored beans, nor more than 10 per cent by count of broken Lima beans and loose skins, may be given a credit of 17 to 20 points. Lima beans that fail to meet this requirement shall not be graded above U. S. Grade B or U. S. Choice, regardless of the total score for the product.

(B) If the Lima beans contain not more than 2 per cent by count of spotted or off colored beans, nor more than 15 per cent by count of broken Lima beans and loose skins, a credit of 13 to 16 points may be allowed. Lima beans that fail to meet this requirement shall not be graded above U. S. Grade C or U. S. Standard regardless of the total score for the product.

(C) If the Lima beans contain not more than 4 per cent by count of spotted or off colored beans, nor more than 20 per cent by count of broken or shriveled Lima beans and loose skins, a credit of 10 to 12 points may be allowed. Lima beans failing to meet this requirement shall be graded Off-Grade Quality (Substandard), regardless of the total score for the product.

(D) If the Lima beans contain more defects than the maximum allowed in subdivision C, a credit of 0 to 19 points may be allowed.

NOTE—Off colored beans or beans that may have become discolored from any cause shall not be considered under Factor I (Color).

»» III. TENDERNESS AND MATURITY

(A) Lima beans that are tender and contain not more than 10 per cent by count of Lima beans with skins removed that will sink immediately in an 18 per cent salt (NaCl) solution but float in a 22 per cent salt (NaCl) solution may be given a credit of 46 to 50 points. Lima beans that fail to meet this requirement shall not be graded above U. S. Grade B or U. S. Choice, regardless of the total score for the product.

(B) If the Lima beans are somewhat firm but not hard and contain not more than 20 per cent by count of beans with skins removed that will sink immediately in a 22 per cent salt (NaCl) solution but will float in a 25 per cent salt (NaCl) solution, a credit of from 40 to 45 points may be allowed. Lima beans that fail to meet this requirement shall not be graded above U. S. Grade C or U. S. Standard, regardless of the total score for the product.

(C) If not more than 20 per cent of the beans sink immediately in a 25 per cent salt (NaCl) solution, of which not more than ¼ of this amount or 5 per cent are shriveled on acount of maturity, a credit of 35 to 39 points may be allowed. Lima beans that fail to meet this requirement shall be graded Off-Grade Quality (Substandard).

(D) If the Lima beans fail to meet the requirements in paragraph C above, a credit of 0 to 34 points may be allowed and they shall be graded Off-Grade Quality (Substandard) regardless of the total score for the product.

Approved:
C. W. KITCHEN
Chief

Approved:
W. G. MEAL
In charge
Fruit and Vegetable Division

Certificate No. .....
Lot or Car No. .....
Size of lot .....

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
SCORE SHEET FOR FROZEN LIMA BEANS

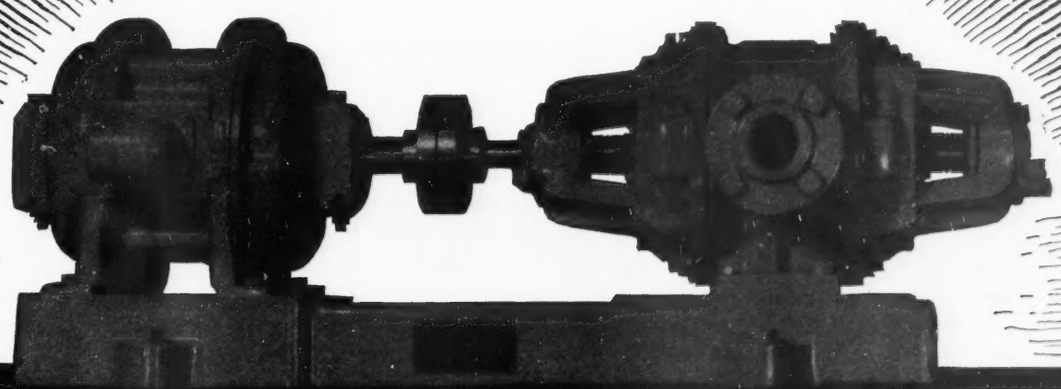
Applicant .....
Address .....
.....
Samples submitted by

PACKAGE SIZE												
PACKER'S MARK												
LABEL												
NET WEIGHT (in ounces)												
FACTORS	Max. Score	Points Allowable										
I. COLOR	30	(A) 27—30 (B) 22—26 (C) 15—21 (D) 0—14										
II. ABSENCE OF DEFECTS	20	(A) 17—20 (B) 13—16 (C) 10—12 (D) 0— 9										
III. TENDERNESS AND MATURITY	50	(A) 46—50 (B) 40—45 (C) 35—39 (D) 0—34										
TOTAL SCORE	100	. . . . .										
GRADE	. . .	. . . . .										

Remarks.....

Graded by..... Date..... Fee $.....

CLEAN COMPRESSED AIR



Nash Air Compressors furnish clean compressed air, free from dust, heat or oil. Nash Compressors perfectly meet the need of the Food and Chemical Industries for clean compressed air for agitating, blending, moving liquids by pressure displacement, and for maintaining pressure on storage tanks.

Nash Compressors furnish clean air without supplementary filters or air washers. They are available in any capacity. Simple, efficient, and economical. One moving part, rotating on ball bearings. No internal wearing parts in metallic contact, and no internal lubrication. Ask for Bulletin D-236.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

"ACCURATE REGULATION OF STEAM TO ATOMIZING BURNERS *means* MONEY SAVING"

*Case No. 319

STRAIGHT LINE FLOW ELIMINATES TURBULENCE . . .

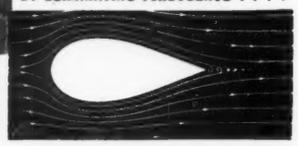
Gets

HIGHEST VALVE CAPACITY

From inlet to outlet the fluid flows through this valve in a straight line — a streamline — almost as though there were a pipe running through the valve housing for the fluid to flow through. There is no detour around a dividing wall—the direction of flow is not changed at right angles because of a seat wall — also, the flow is not broken up by valve stems, springs, or other parts. The net result is NO TURBULENCE, hence MORE CAPACITY.

CASH STANDARD
Streamlined
TYPE 1000 PRESSURE
REDUCING VALVE
. . . GIVES YOU UNUSUAL EFFICIENCY PROVIDED BY THE STRAIGHT LINE FLOW OF AIR-STEAM-WATER-OIL AND OTHER LIQUIDS AND GASES THROUGH THE VALVE

SHOWING HOW THIS VALVE INCREASES PERFORMANCE RESULTS BY ELIMINATING TURBULENCE . . . .



. . . . AND HOW YOU ELIMINATE THIS TURBULENCE

Because of the streamlined flow, you are easily able to meet peak demand and yet hold the pressure constant at the same time. You get abundant flow when you need it most. No turbulence is set up and therefore operation is smoother—you have no pressure variation—you have constant, dependable action—you experience no spoilage results due to turbulence.

Statements from Streamlined (Type 1000) Valve users have come to us from all parts of the country—these verify the fact that this modern Streamlined Valve has no complicated parts to get out of order—no small ports or passages to clog up—nothing to keep it from working dependably—that you are easily able to meet peak demand and yet hold the pressure constant at the same time—that you really get high capacity flow when you need it most.

For example Case No. 305 says: "We are getting a better and more uniform product because our processing equipment is functioning better than ever before due to the even control the '1000' Valve is giving us. We also like the large capacity it is giving us."

Case No. 318 says: "Yes Sir! It's easy to say nice things about your Streamlined Valves. We like them very much. They have a whale of a lot of capacity. They control the reduced pressure within exceptionally close limits. They require NO maintenance—and I do mean 'NO!'."

The high pressure entirely confined to the small inlet chamber (cross hatched section) makes this valve good for initial pressures up to 3,000 lbs. The valve is furnished in sizes from ¼" x ¼" up to 2" x 2½" inclusive. For delivery pressures below atmosphere, a special diaphragm spring arrangement is used

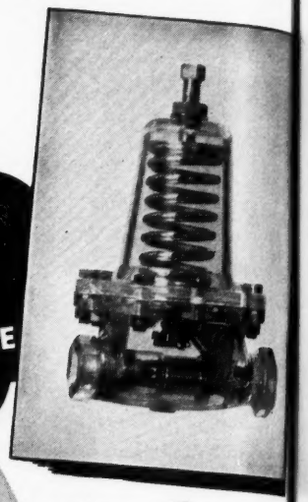
SEND FOR BULLETIN 1000

30-DAY TRIAL *Free* OFFER

Write for details on this special offer made to give you an opportunity to find new ways to save money

* "Regarding your Streamlined Valves, we use them for atomizing steam to our burners. Correct atomization means money saving. We need the lowest possible friction loss (pressure drop) through the valve that is possible. We need highest capacity possible on low pressure difference across the valve. We need constant delivery pressure from the valve regardless of changes in demand on the valve. Your Streamlined Valves give us these qualities better than any other make we have used. And it may interest you to know that we have found that we can count on your Capacity Charts too."

A *Winner* WINS FIRST PRIZE



PHOTOGRAPH SENT *Free*

Recently we had a Streamlined Valve made of crystal clear plastic (pictured above) as a display piece for our plant.

The fabricator made a duplicate for himself and entered it in MODERN PLASTIC Magazine's Annual Contest.

First prize in the Industrial Parts, Moulded Group was awarded the plastic Streamlined Valve by MODERN PLASTIC Magazine.

We had a few photographic prints made of the Crystal Clear Streamlined Valve on display in our plant. Each of our representatives was given one. These men have found that the picture proved interesting to people they called upon because the entire simple and efficient construction of the Streamlined 1000 Valve is seen.

You may find it interesting to have one of these photos so that you can see the construction that enables straight line flow—so you can see construction that eliminates complicated parts—and that insures, as users say, "lots of capacity and exceptionally close pressure control."

A photograph will be sent you upon request.

A. W. CASH COMPANY

DECATUR, ILLINOIS

CASH STANDARD
CONTROLS . . VALVES

WILL *YOUR* LABEL SATISFY HER?

SHE is typical of thousands of American Housewives who are beginning to adopt an added standard in judging food products and advertising claims for them.

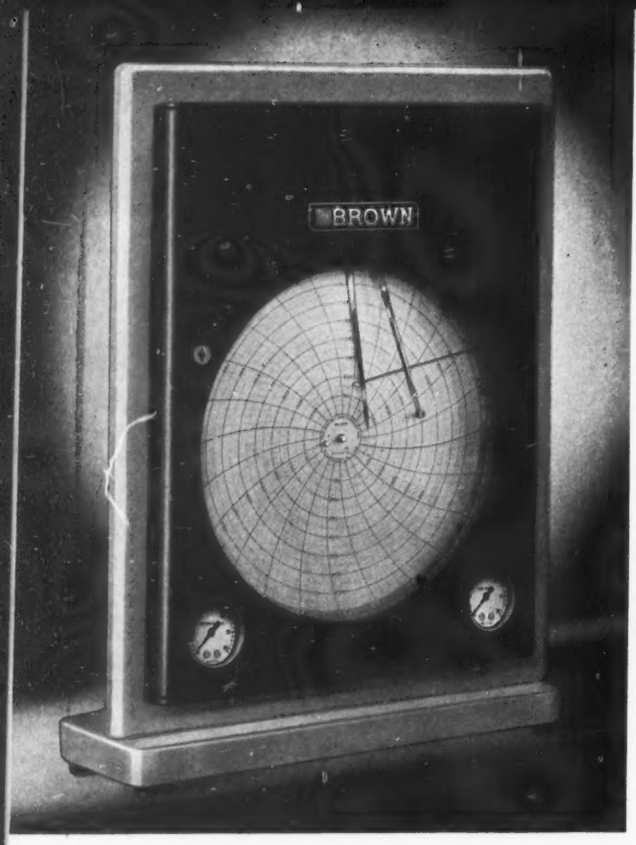
She is going to require high vitamin value—and you will not be able to hold her interest with mere general statements. She is going to insist on specific declarations, so many units of vitamin B_1, so many of C—and she will know herself whether the amounts named are a meaningless gesture or worth while.

For Mrs. American Housewife is coming to know her vitamins, to realize for example that vitamin B_1 is required for growth and nerve stability, and influences appetite and carbohydrate metabolism; and that vitamin C maintains the intercellular cementing substance of connective tissues, is necessary for normal tooth structure and firm gums, for capillary resistance, and has an anti-infective influence. She knows that these two vitamins especially may be destroyed or lost in modern processing and cooking, that they now can be restored and that medical authorities and nutritional experts endorse vitamin restoration in foods.

Have your products been assayed for vitamins? Can they really be said to be "vitamin-rich"? Consult us without obligation, let us tell you how to *build up* vitamin potencies to meet these new requirements.

And if you already know the answers and expect to be buying crystalline synthetic vitamin B_1 (thiamin chloride) or vitamin C (ascorbic acid) over the coming months, let us show you how we are best equipped to be your exclusive source of supply. HOFFMANN-LA ROCHE, INC. • NUTLEY, N.J.
VITAMIN DIVISION

HOFFMANN-LA ROCHE, INC.
FAMOUS FOR PHARMACEUTICAL CHEMICALS



ADVANCED

OUTSTANDING

The outstanding performance of the *AIR-o-LINE* and associated air-operated controllers has been stepped up still further by added refinements in the control system—plus the greatly increased accuracy and simplicity of the new actuating elements.

Added beauty goes hand in hand with advanced mechanical design. The classic, simple lines of the modern rectangular case are in keeping with the simplicity and precision of the mechanism it contains. These control instruments blend with the panel surface and surrounding instruments to give the much desired flush appearance.

❶ SPIRAL ACTUATING ELEMENTS

Sturdy, flat spiral actuating elements of bronze or special alloy steel heat-treated to insure permanent accuracy and long life.

Spiral elements have exceptionally high overrange capacity. As additional safeguard, a special safety link is provided between element and pen shaft, containing two-way spring overload release. Also protects against damage if pen is manually deflected.

❷ RECORDING MECHANISM

Linkage is reduced to a minimum. Outboard bearing and hardened pivots insure unhampered pen movement and instant response.

Stainless steel pen arm, 8" long, with ribbed reinforcement permits pen travel of 4¾". Pen and pen arm are non-corroding, easily removed, cleaned and replaced.

❸ CHART DRIVE

Chart is firmly secured to driving mechanism by tapered hub and tapered chart positioning stud. Charts are punched to correspond with tapered studs on driving hub. Only necessary to place chart over studs which lock it firmly to driving mechanism. Eliminates chart slippage. No knobs or chain.

Charts when renewed are automatically in time; as the tapered position stud is in effect the hour hand of the electric clock. If current failure makes it necessary to reset chart to correct time line, a friction clutch permits manual rotation.

❹ CONTROL MECHANISM

Hermetically sealed unit is corrosion resistant, protected against dirt, self-compensating for ambient temperatures and highly sensitive to smallest pen or pointer movement. Stationary nozzle mounting eliminates the need for additional bellows or moving swivel type air connections.

❺ THROTTLING RANGE DIAL

Serrated edge on dial permits instant finger tip precision setting without removal of the chart plate. No tool necessary. Graduated dial guides the operator in "tuning in" the controller to process characteristics without interruption to automatic control.

❻ AUTOMATIC RESET DIAL

Accessible for finger tip adjustment—no tool necessary. A packless needle valve eliminates the need for changing lengths of resistance tubing in reset mechanism. Affords quick and precise means of "tuning in" the controller to exactly meet process conditions.

❼ CONTROL INDEX

Control index can be set exactly at any point on the chart where control is to be maintained. Precision setting of the control point is made possible as 9½ turns of the knob are required to move the control index full scale.

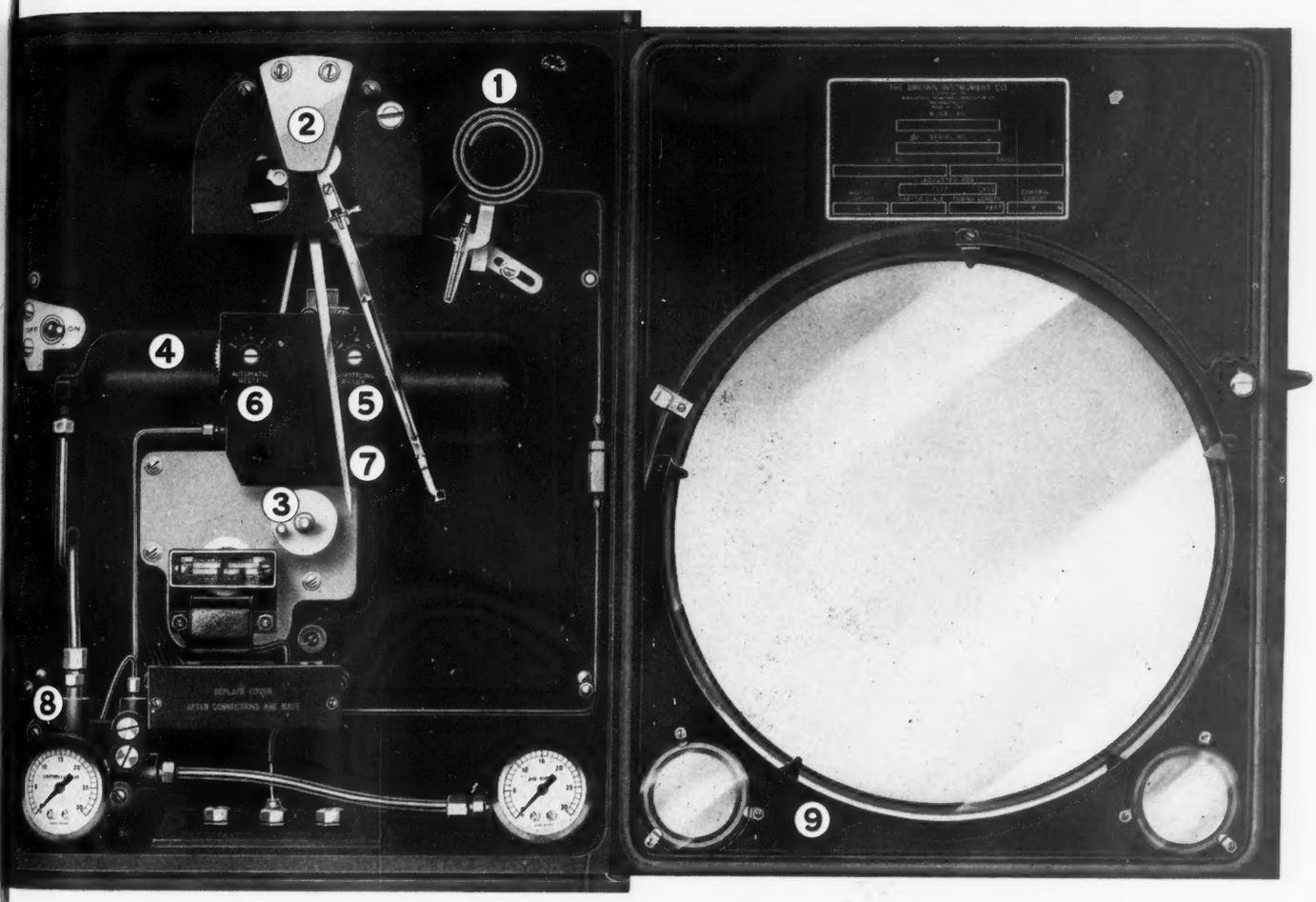
Knob for setting control index is normally inside case under lock to prevent tampering by unauthorized persons. Where desired, it can be furnished external.

for

INDICATING . . . RECORDING . . . CONTROLLING

TEMPERATURES — PRESSURES — FLOWS AND LIQUID LEVELS

DESIGN *adds to*
PERFORMANCE WITH SIMPLICITY



Interior view of latest development in Brown Air-Operated Controller.

8 NON-BLEED PILOT VALVE

The non-bleed, pressure balanced pilot valve *uses air only when increasing the controlled valve pressure,* thus reducing air consumption to a minimum. The non-bleed construction permits the use of large supply and exhaust ports capable of very fast control valve operation.

Performance proved by exhaustive laboratory and field tests.

9 RECTANGULAR CASE

Streamlined modern rectangular case of die-cast aluminum, dust and moisture-proof. New special baked durable black enamel finish, created to resist moist, salt or acid atmospheres. Shield on top of case prevents dust from accumulating on door and falling into case when door is opened.

Universal case permits flush or front-of-board mounting.

For full details write The Brown Instrument Company, *a division of Minneapolis-Honeywell Regulator Co.*, 4502 Wayne Avenue, Philadelphia, Pa. Offices in all principal cities. Toronto, Canada: 117 Peter St. . . . Amsterdam-C, Holland: Wijdesteeg 4. . . . England: Wadsworth Road, Perivale, Greenford, Middlesex. . . . Stockholm, 16, Sweden: Nybrokajen 7.

BROWN AIR-OPERATED CONTROLLERS

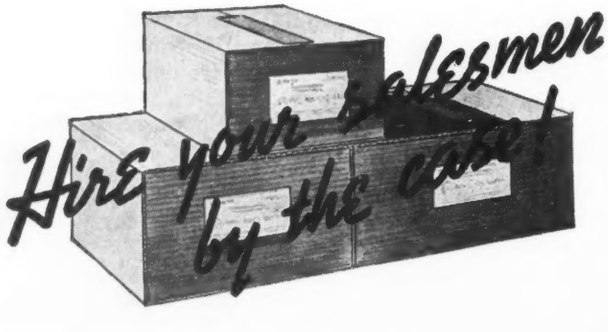
Outstanding Performance with Simplicity

ALL SORTS OF PRODUCTS FIND GLASS PRODUCES EXTRA SALES!

Packers from Coast to Coast are Discovering the Extra Selling Power of Glass Containers

MORE and more packers are switching to glass containers! Because, regularly and repeatedly, glass-packs are proving their superior selling power . . . their extra, profit-building punch . . . for an almost endless variety of grocery store items.

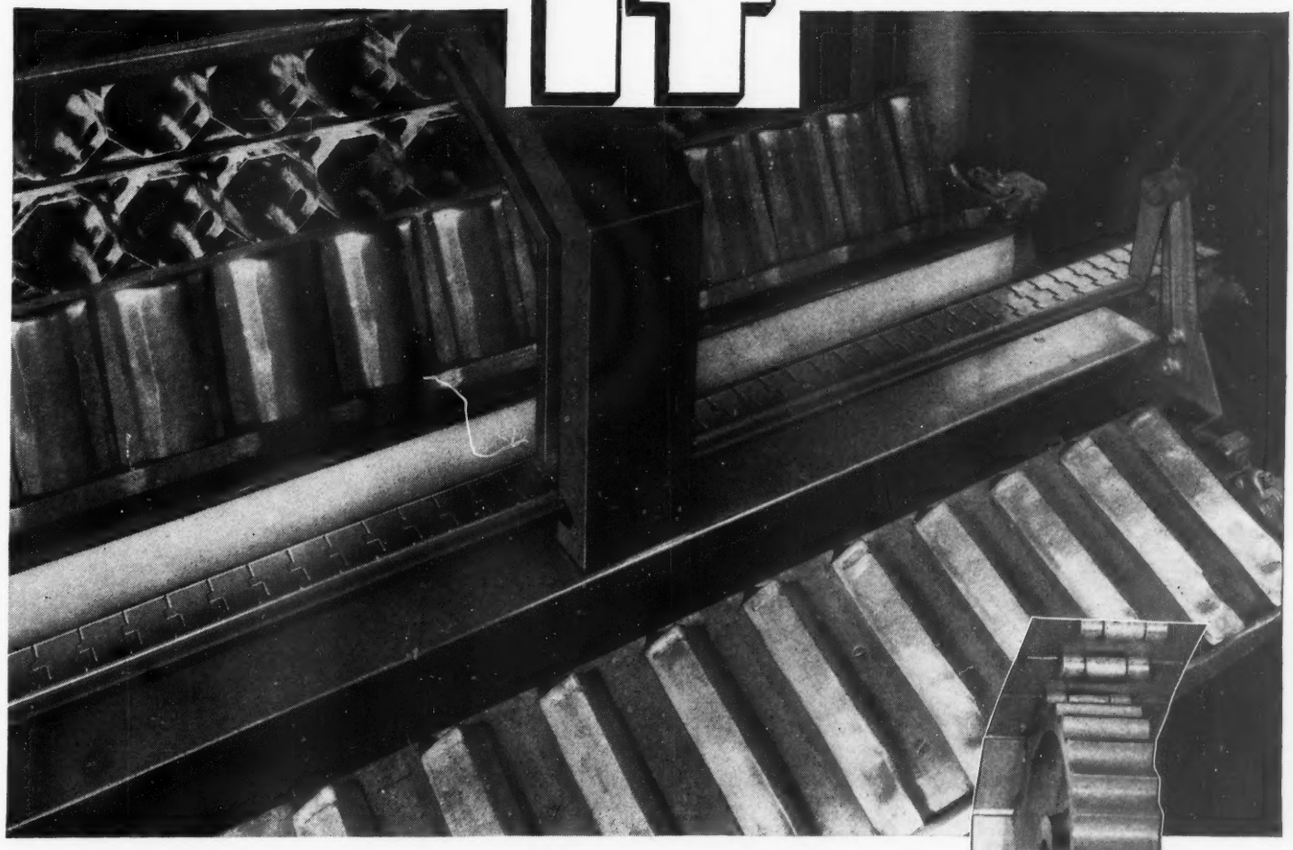
Glass containers are natural-born salesmen . . . because they're carefully made that way. Because they're transparent, they "advertise" the natural color, the natural quality, the natural appetite-appeal of their contents. They encourage impulse purchases—extra, unplanned sales. And another thing—shoppers are always willing to recognize *quality* merchandise when they see it.



Ask your glass and closure manufacturers to look into your container problems. They're equipped to give you real help.

GLASS CONTAINER ASSOCIATION 19 WEST 44th ST. NEW YORK CITY

HOW TO HANDLE IT ON BOTTLE WASHERS



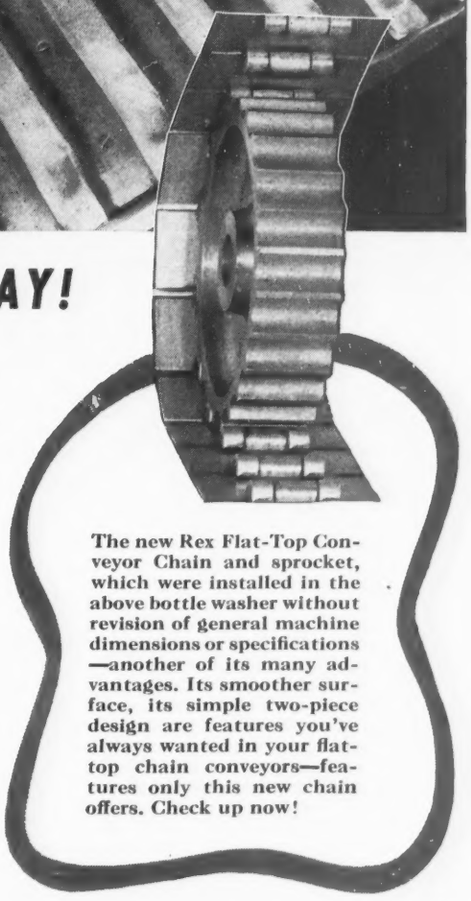
HERE'S A NEW AND BETTER WAY!

Every month more and more builders and users of bottle and can handling machinery are turning to this new Rex flat-top conveyor chain!

One after another, a long line of actual cases could be cited to you to show how successfully Rex No. S-815 Flat-Top Chain has been applied to bring new efficiency to both new and existing machines and conveyors. But the best story of all is told by the chain itself:

You need only look at it to see the advantages of its unique "door hinge" design. You can tell at a glance that it will be tip-free in operation, easy to clean, easy to install; that it will last far longer and practically eliminate breakage and pile-ups on your bottle and can conveyors.

One look—and you'll see why it will pay you to fill in and send this coupon to get complete details.



The new Rex Flat-Top Conveyor Chain and sprocket, which were installed in the above bottle washer without revision of general machine dimensions or specifications—another of its many advantages. Its smoother surface, its simple two-piece design are features you've always wanted in your flat-top chain conveyors—features only this new chain offers. Check up now!

Quick delivery from stock on Chains, Sprockets and Transmission Equipment

REX FLAT-TOP CONVEYOR CHAIN

CHAIN BELT COMPANY of Milwaukee

CHAIN BELT COMPANY
161 W. Bruce St., Milwaukee, Wis.
Gentlemen: Please send me my copy of Bulletin No. 335, "Rex Flat-Top Conveyor Chain."

Firm Name .....

By ..... *Title* .....

Address .....

City ..... *State* .....

How a LIGHT-CONDITIONED office helps sell cheese

300 and 500 watt G-E MAZDA lamps in indirect fixtures provide 25 to 35 footcandles of light in this general office of the Kraft-Phenix Cheese Corporation in Chicago.

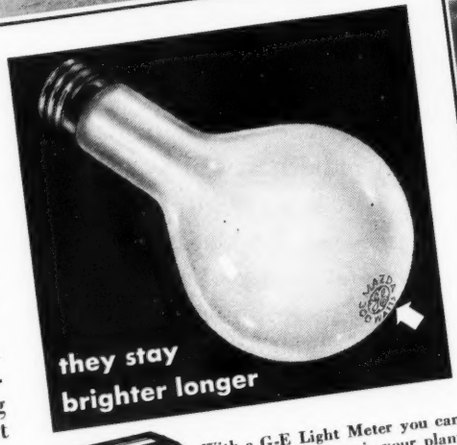
Kraft-Phenix Cheese Corporation uses G-E MAZDA lamps for modern office lighting.

THE general office of the Kraft-Phenix Cheese Corporation in Chicago is a good example of modern office lighting designed to make seeing easier . . . and so to increase office efficiency.

Well-diffused lighting is provided by indirect fixtures which serve as combined air-conditioning grills and luminaires, spaced about ten feet apart.

Good light speeds work in any office because it helps everyone see more easily, work with less fatigue, and do a more efficient job. Of course one of the requirements of good lighting is the use of quality lamps. G-E MAZDA lamps give more light for the current consumed because they are made to *stay brighter longer*.

For worthwhile information on how light-conditioning can increase efficiency in your plant, write to General Electric Company, Dept. 166-FI-L, Nela Park, Cleveland, Ohio.

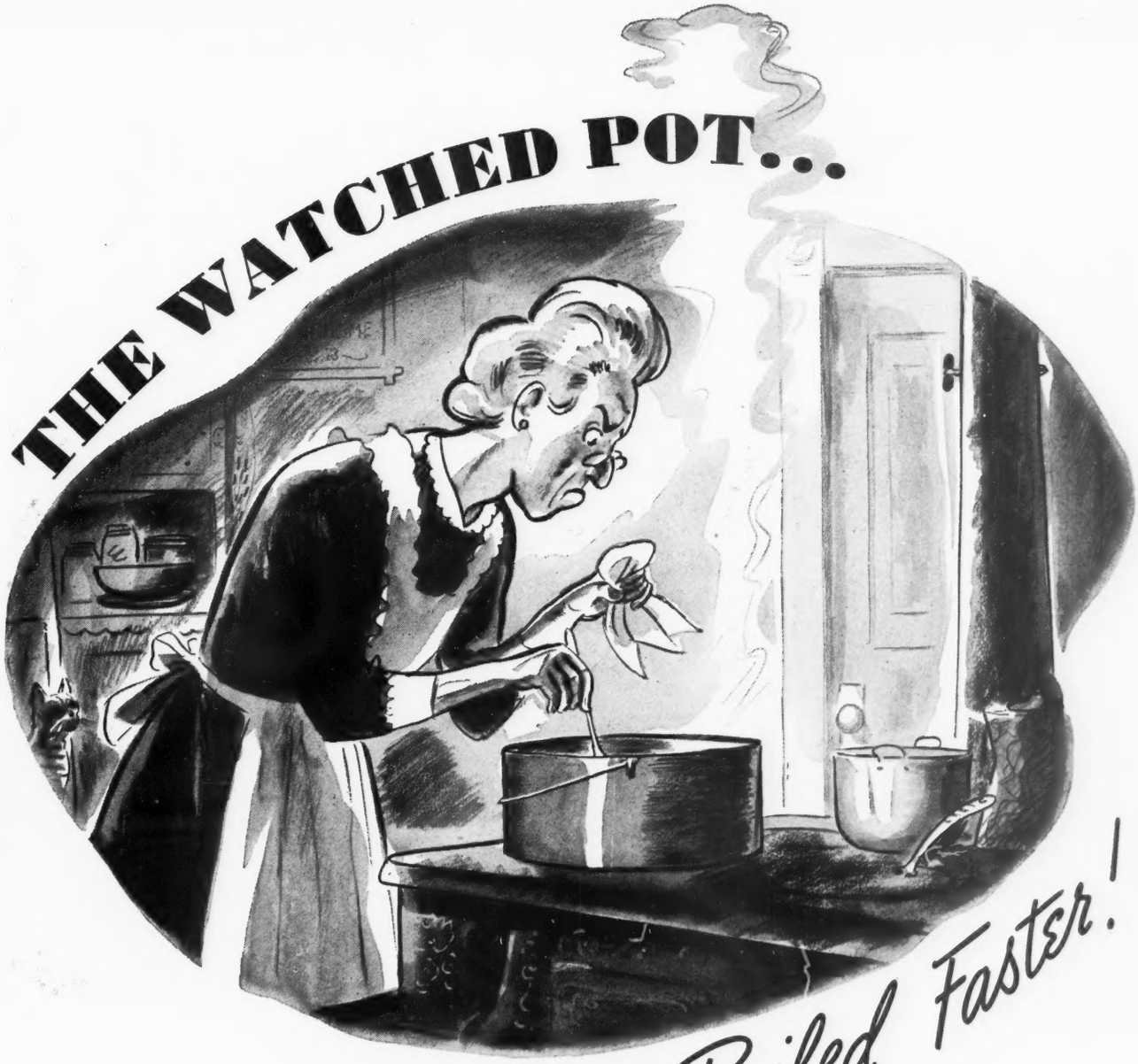


With a G-E Light Meter you can measure the lighting in your plant and see whether it meets modern seeing standards. It costs only $11.50.

G-E MAZDA LAMPS

GENERAL ELECTRIC

THE WATCHED POT...



...THAT *Boiled Faster!*

In a comparative test, it heated water almost twice as fast as other kettles

The "pot" in question was made of a well-known metal. Hundreds of food plants use this metal for kettles . . . usually for the same reason: Food plant executives know that Nickel makes strong, durable equipment...and also protects the purity of foods.

Yet that's only *part* of the story. For in terms of *immediate savings* . . . on time and on labor . . . Nickel offers an even bigger advantage. Proof? See how Nickel showed up in a recent test:

> ***12 minutes*** **. . . was the time taken by kettles of both corrosion resisting steel and of Inconel* to bring water to the boil.**
>
> ***7 minutes . . . or little more than half*** **...was the time required by a Nickel kettle of the same capacity, using the same pressure of steam.**

Because Nickel kettles are rust proof, easy to keep clean, and good for years of service, they *save* you money. And because they cook quicker they help you *make* money.

So when you think about adding to or replacing cooking *equipment*, remember how to cut cooking *time:* Specify Nickel. Write for further information on the excellent heat transfer qualities and other advantages offered by Nickel. Address:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street **New York, N. Y.**

*Reg. U. S. Pat. Off.

NICKEL

Take **WEIGHT** *out of packaging*
Add Eye-Appeal
with Armstrong's new LIGHT-WEIGHT *line*

LIGHT in weight, without sacrifice in strength, Armstrong's new LIGHT-WEIGHT line of glass containers offers additional profit opportunities for you.

Recently developed manufacturing technique provides more uniform distribution of glass throughout Armstrong containers. This assures adequate strength with less weight. Shipping costs are thus reduced. In addition, uniformity of dimensions and capacity in every glass container results in high-speed packing performance.

Armstrong glass containers give your food products maximum visibility and attention value. They are crystal clear to afford appetizing display of food products and their modern styling gives you a package with greater sales-appeal. The graceful Sunburst pattern presents a streamlined, up-to-date appearance while still providing ample space for the label.

Armstrong's LIGHT-WEIGHT line is available in a wide range of sizes and shapes—Ovals, Pantry Jars, Rounds, and Mayonnaise Jars. Our Package Design Bureau will be glad to help you create distinctive, customer-attracting packaging suggestions for your food products. Get all the facts. Write Armstrong Cork Company, Glass and Closure Division, 919 Arch St., Lancaster, Pa.

Armstrong's Metal Caps offer dependable, sure-sealing protection for the flavor and quality of your food products. These modern closures are available in a wide range of attractive colors to help increase the sales-appeal of your entire food package.

Armstrong's GLASS CONTAINERS

PFAUDLER NEWS FLASHES

FOOD EDITION

DECEMBER, 1939 PUBLISHED BY THE PFAUDLER CO., ROCHESTER, N. Y. Vol. 1, No. 3

NEW CONCENTRATOR IMPROVES FLAVOR AND COLOR

Recent Federal Law Steps Up Standards

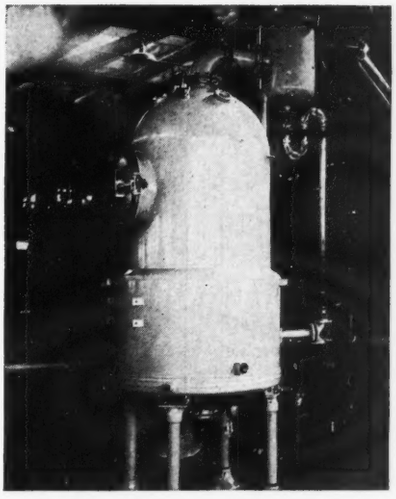
Rochester, N. Y.—Concentrating fruit pulp 8 to 1 at a rate of 30 gallons per hour, a new Pfaudler Vacuum Concentrator has helped one New York State manufacturer of true fruit extracts to reduce his costs and at the same time to conform in all respects with the new Federal regulations.

In spite of high citric and tartaric acid content, natural color and flavor are retained to a remarkable degree. This is due to the Pfaudler Glass-Lined interior which eliminates metallic contact during concentration.

The Concentrator has a working capacity of 200 gallons and is double jacketed, a full vacuum is used for full batch and is progressively decreased as volume diminishes.

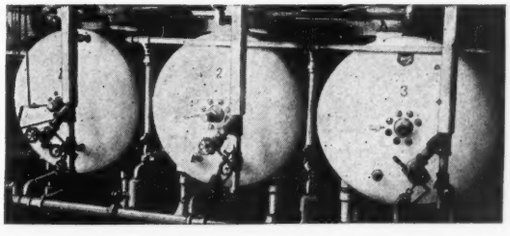
Foam trap at top of pan eliminates entrained air. 40% alcohol solution is recovered.

The Pfaudler Vacuum Concentrator enables users to meet the most rigid Federal or State standards with a natural colored and flavored product —and frequently at less cost.



GLASS-LINED COOKERS END CORN DISCOLORATION

Minnesota Valley Canning Company Reports Fine Results



Blue Earth, Minn.—Director of Research, G. C. Scott of the Minnesota Valley Canning Company, comments on his experience with Pfaudler Glass-Lined corn cookers as follows:

"We have had installed in our Blue Earth, Minnesota plant since 1930 four of your six-hundred gallon Glass-Lined cream style corn blending mixers. These have been in use every season since their installation and have proven entirely satisfactory in every respect. The mixers are still in excellent condition.

"There is, of course, no chance for corrosion or contamination of the product. Our plant operators appreciate the ease with which these tanks may be cleaned as the corn does not tend to stick and bake on the tanks.

"Metallic contamination of cream style corn seriously impairs the color and flavor of the product, and the use of Glass-Lined equipment has safeguarded the production of Del Maiz Brand Cream Style Corn."

It's not too early to plan next year's canning equipment requirements. What is your problem?

6,000 VISIT COAST DAIRY SHOW

Pfaudler Exhibit Attracts

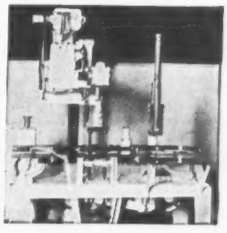
San Francisco, Cal.—One of the main features of the Pfaudler exhibit at the first Coast Dairy Show was the new Pfaudler-King Filler. On-the-floor sales reflected the satisfaction of the outstanding operating and design features of this new Filler. A poll of visitors disclosed the fact that practically every visitor called it the best looking filler on the market today. Have you Bulletin 789?

Shown for the first time was the new Piston Type Filler for ice cream mix, processed cheese and such food products as pumpkin, mayonnaise, potted meats, jams, etc. Bulletin 790 tells the story.

View of Pfaudler Booth at Coast Dairy Show

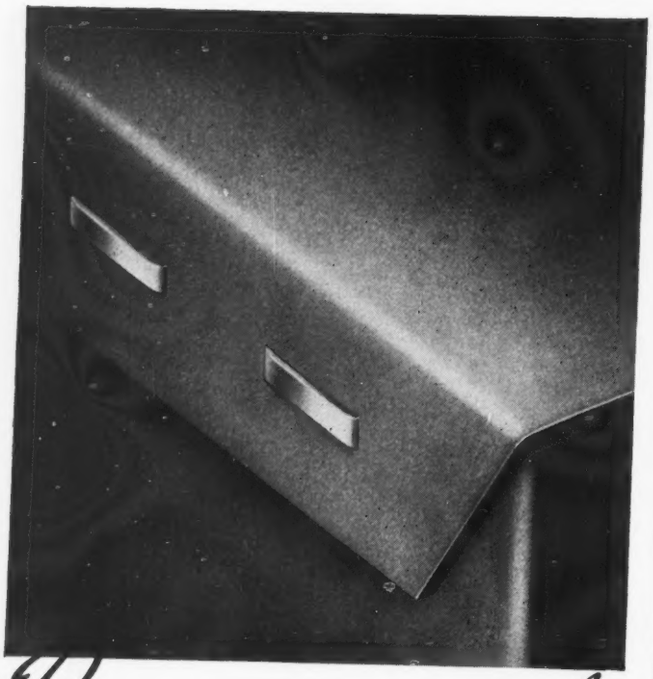
1940 LINE PLEASES

Improved features common to Glass-Lined and stainless steel "Lo-Vat" pasteurizers displayed included—New two speed motor drive as standard—New one piece counter-balanced cover—New top-hold-down leak detector valve as well as increased jacket area for faster heating and cooling.



New Pfaudler-King Piston Filler shown at San Francisco for first time. Equipped with a chain feed, bottom fill and automatic capper. Easily adjusted for different height containers.

THE PFAUDLER CO., *Executive Offices:* Rochester, N. Y., *Factories:* Rochester, N. Y., and Elyria, O., *Branch Offices:* New York, Philadelphia, Boston, Chicago. The Pfaudler Sales Co., San Francisco and Los Angeles.



Dress up your carton

with Stitches that are Becoming

Keeping your cartons "in style" will improve their appearance and sales appeal. The trend is definitely toward Colorstitch —the colored stitching wire that will blend or contrast with the color of your printed cartons—as you wish.

ACME *ColorStitch*

Acme Colorstitch is used satisfactorily on all carton stitching equipment. Made in all standard, flat stapling wire sizes, Colorstitch is furnished in one piece, five- and ten-pound coils which speed production and lower costs. Mail the coupon for a sample card which will suggest ways of dressing up your cartons for more sales.

ACME *SilverStitch*

Stitching wire galvanized by the special ACME process assures rust-free staples of greater durability. Uniform temper, size and quality and the one-piece coils assure maximum production and economy when you use ACME SilverStitch.

ACME STEEL COMPANY
2845 Archer Avenue, Chicago, Illinois
Branches and Sales Offices in Principal Cities

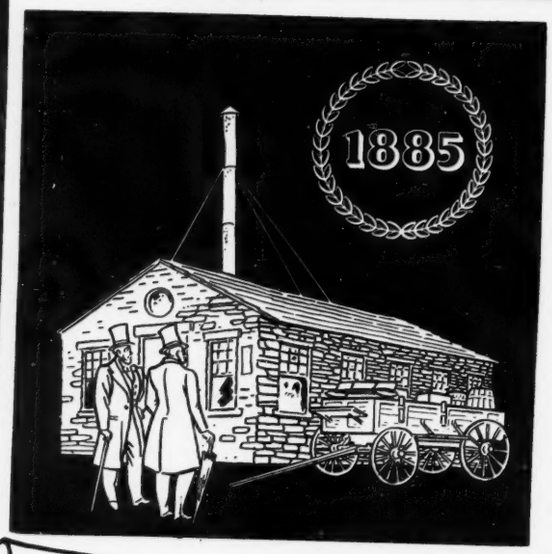
ACME STEEL COMPANY,
2845 Archer Ave.,
Chicago, Ill.

☐ Send the COLORSTITCH sample card.
☐ Send a FREE 5-lb. coil of SILVERSTITCH, size ——.

Name .....

Address .....

City .....State .....



DO YOU KNOW—

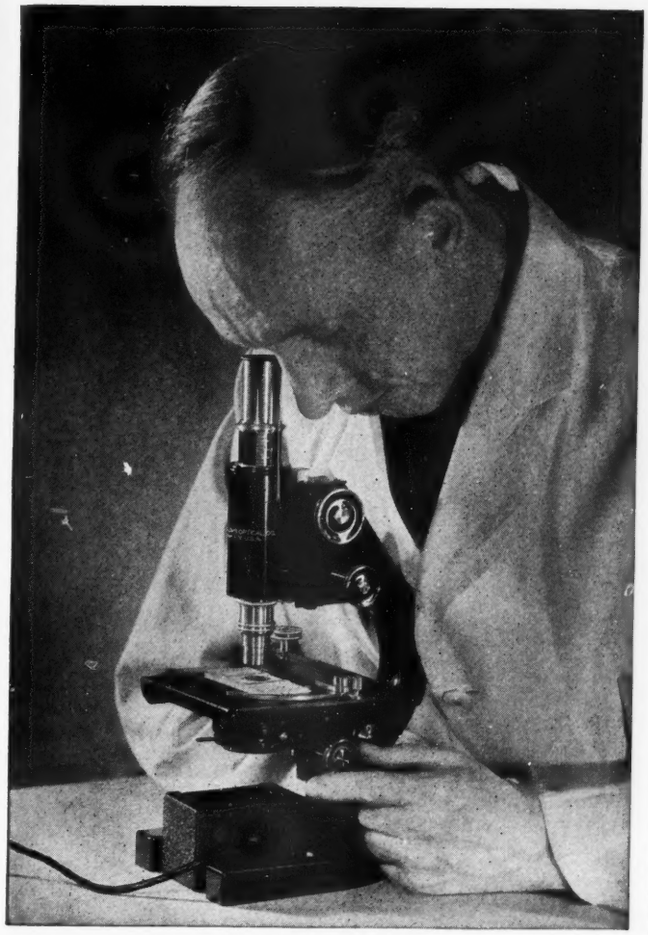
A new era in the manufacturing of adhesives began in 1885, when Messrs. Jungbluth and Weingartner founded The Arabol Manufacturing Company. Their small factory in New York City, one of the first practical establishments for the production of glues and pastes from cereals, has developed into an organization whose products are used throughout the world. True to the ideal of the founders, Arabol's guiding principle is still the production of the finest adhesives. To meet the exacting requirements of modern industry's special adhesive problems, Arabol today produces over 100 standard grades and over 1000 special qualities of fine adhesives.

BE SURE IT SUITS YOUR PURPOSE

ARABOL
MANUFACTURING COMPANY

Established 1885

110 EAST 42nd STREET, NEW YORK
54th AVENUE & 18th STREET · CHICAGO, ILL.
39 STERLING STREET · SAN FRANCISCO, CAL.
Offices & Warehouses at Boston and Philadelphia



THIS B&L MICROSCOPE MAY BE THE ANSWER TO YOUR PROBLEMS

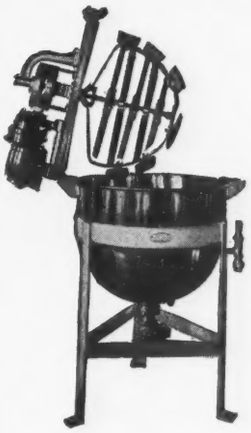
The attempt to get along without a microscope in the processing of foods reduces your chances for a uniform top grade pack. Experience has shown that often a Bausch & Lomb microscope has provided the answer to difficult packing problems through insurance of exact knowledge of mould and bacteria counts, etc.

Designed to meet the particular problems of the food processor, the B&L MICROSCOPE TYPE H, with its wide range of available accessories is accurate, simple to use, and economically priced. For complete description and information write Bausch & Lomb Optical Co., 603 St. Paul St., Rochester, N. Y.

BAUSCH & LOMB

FOR YOUR EYES, INSIST ON BAUSCH & LOMB EYEWEAR, MADE FROM BAUSCH & LOMB GLASS TO BAUSCH & LOMB HIGH STANDARDS OF PRECISION . . . . . .

Hamilton Steam-Jacketed Kettles



ALL STYLES ANY SIZE

–made in Stainless Steel, Pure Nickel, Monel Metal, Copper. Nationally known for their quality of materials, construction and performance. Built by an organization that has made kettles for more than 66 years.

•

FREE!

A new bulletin that tells all about these fine kettles—contains information that may decidedly cut your production costs and increase the quality of your product. If you want better kettle performance at minimum cost—write . . . at once.

•

HAMILTON KETTLE WORKS COMPANY
HAMILTON
OHIO

GREATER STABILITY IN LONG-TIME SERVICE

"IT'S the persistence of quality that counts in an oil," says this operating manager. "We can buy plenty of oils with satisfactory characteristics as purchased, but this Gulf lubricant is the only one we have found that *retains its essential qualities* in long-time service. Its stability is truly remarkable."

Here's the real advantage you get when you use Gulf's higher quality oils: Their greater stability is reflected in the operation of your equipment. These better oils help plant men step up production schedules, cut down costs of machine operation. Savings in maintenance alone often exceed the total cost of the lubricants.

If you are not entirely satisfied with your plant production—from the standpoint of quality, quantity, or *costs*—we suggest that you ask a Gulf engineer to check over your equipment and recommend improved lubrication practice. He works tactfully with plant men, has a keen appreciation of their problems, and will help you make operating improvements all along the line. This cooperative service is extended to plant operators without extra charge.

Gulf's higher quality lubricants are quickly available to you through more than 1100 warehouses in 30 states from Maine to Texas. Write or 'phone your nearest distributing point today . . . Gulf Oil Corporation—Gulf Refining Company, Gulf Building, Pittsburgh, Pa.

GULF INDUSTRIAL LUBRICATION

A COMPLETE LINE OF MORE THAN 400 OILS AND GREASES FOR INDUSTRY

It doesn't take an expert to prove that a container which is lighter in weight, sturdier, and more compact in size will reduce shipping costs. Quite naturally, then, you will find your traffic manager suggesting cans as a logical economy move. Many manufacturers have found that in addition to savings in shipping and handling, cans eliminate many of the difficulties of filling, labeling, and packing—thereby speeding up production.

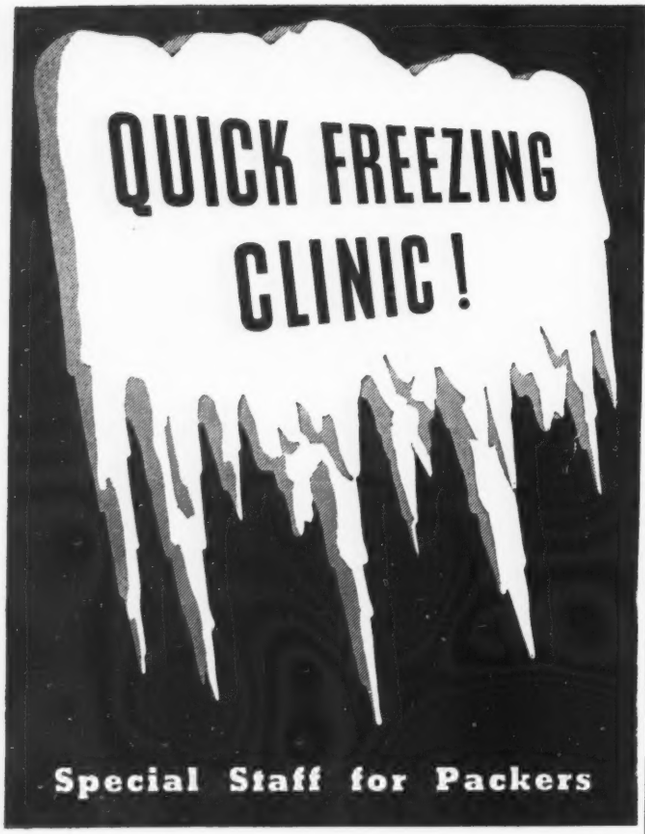
Weigh these advantages carefully and you'll find the answer to your problem by packing your product in a quality can—made by Continental!

C There is hardly a product that wouldn't be more acceptable packaged in a can—although "knowing how" may sometimes be a matter of laboratory research or package design.

Continental offers complete facilities for determining your requirements. Call upon us anytime.

CONTINENTAL CAN COMPANY

NEW YORK · CHICAGO · SAN FRANCISCO · MONTREAL · TORONTO · HAVANA



ALONG with the development of various types of packaging for Quick-Frozen Foods, Container Corporation engineers have of necessity entered into almost every phase of the Quick-Freezing industry, from growing to packing procedure to branding and distribution. In fact, these Concora specialists have had much to do with the present trend toward standardization of packing procedures, size of packs, and distribution methods.

This special Concora Quick-Freezing staff is now available to any present or prospective packer. With a background of experience as old as the industry, with the most complete and up-to-date information on packing procedures, they combine a record of many successful packaging applications.

A letter or call to any Container Corporation office will bring you the services of the staff.

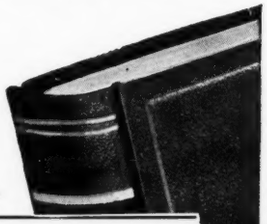
CONTAINER CORPORATION OF AMERICA

GENERAL OFFICES: 111 WEST WASHINGTON STREET, CHICAGO, ILLINOIS

New York • Rochester • Philadelphia • Pittsburgh • Cincinnati
Cleveland • Detroit • Peoria • Baltimore • Louisville • Indianapolis
Minneapolis • Akron • Wabash • Anderson, Ind. • Natick, Mass.

THIS NEW BOOK TELLS YOU

- *the economics of marketing through food brokers*
- *how the broker operates*
- *how to use the broker to get national distribution and hold down costs*



MARKETING THROUGH FOOD BROKERS

By A. URBAN SHIRK
President of National Marketing, Inc.

$3.50

HERE is an invaluable book, both for the food broker and for the producer, covering fully and plainly the economics and procedure of marketing grocery products through food brokers. All channels of distribution are covered to show exactly where the food broker fits in and the advantages in covering the market, reducing sales costs, etc., that result from utilizing his services. Where brokers are, how they are organized, how they operate, how to select a broker, and how to deal with him are among the facts covered, with all details on best accepted methods in every step of the broker's work and his relations with the principal. A well-rounded and practical manual for all concerned with this branch of marketing.

Look up your questions in these 12 authoritative chapters

Marketing Methods in the Grocery Field
The Food Broker and How He Functions
Selecting and Appointing a Food Broker
Brokerage Rates, Contracts, and Payments
The Allocation of Territory
Coordination with the Food Broker
Quota Systems and the Food Broker
Sales Statistics, Records, and Charts
The Broker's Office and How It is Managed
How the Food Broker Serves the Grocery Industry
The Food Broker and the Advertising Campaign
The Food Industry Today and Tomorrow

10 DAYS' FREE TRIAL — SEND THIS COUPON

McGRAW-HILL ON-APPROVAL COUPON

McGraw-Hill Book Co., Inc., 330 W. 42nd St., N. Y. C.

Send me Shirk—Marketing through Food Brokers for 10 days' examination on approval. In 10 days I will send $3.50, plus few cents postage, or return book postpaid. (We pay postage on orders accompanied by remittance.)

Name .....

Address .....

City and State .....

Position .....

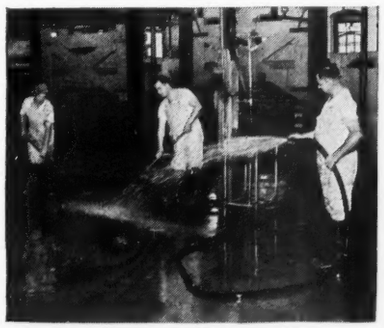
Company Food-12-39

(Books sent on approval in U. S. and Canada only.)

SPICK AND SPAN FLOORS *in a JIFFY!*

TODAY'S FLOORS still need cleaning but Metso Cleaners do it quicker. Fast-wetting action on dirt and grease rolls the dirt right off.

Another unusual advantage on concrete is that the continuous use of Metso makes each cleaning easier because oil and grease do not penetrate as much into Metso-cleaned concrete.



Cleaning concrete floors in packing plant

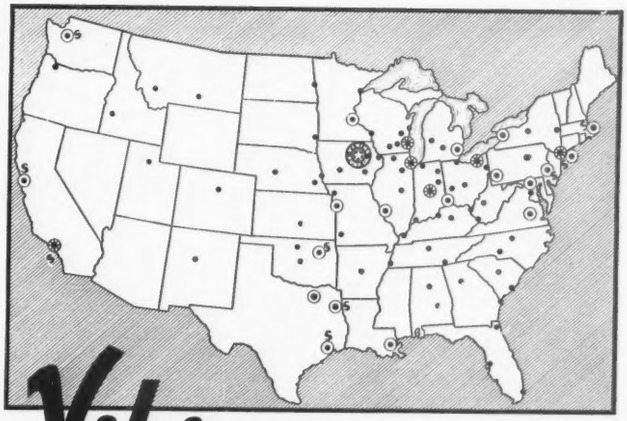
See the difference in your plant floors when you use Metso. Let us send you a test sample. The clean-up is quick, thorough and economical.

PHILADELPHIA QUARTZ CO.

General Offices & Laboratory: 122 S. Third St., Phila., Pa.
Chicago Sales Office: 205 W. Wacker Drive. Stocks in 60 cities.
Sold in Canada by NATIONAL SILICATES LTD., Toronto, Ont.

SODIUM METASILICATE U. S. Patent 1898707

METSO CLEANERS



Viking... NATION WIDE IN SALES AND SERVICE!

Viking is ready to serve you. Sales and service offices, located in every section of the country, are equipped to aid you in the solution of every pumping problem — the fulfillment of every pumping need. It has always been the policy of the Viking Pump Company, world's largest rotary pump manufacturer, to build pumps the finest money can buy, to offer service second to none.

• • •

District Sales and Engineering Offices

S **Stock**

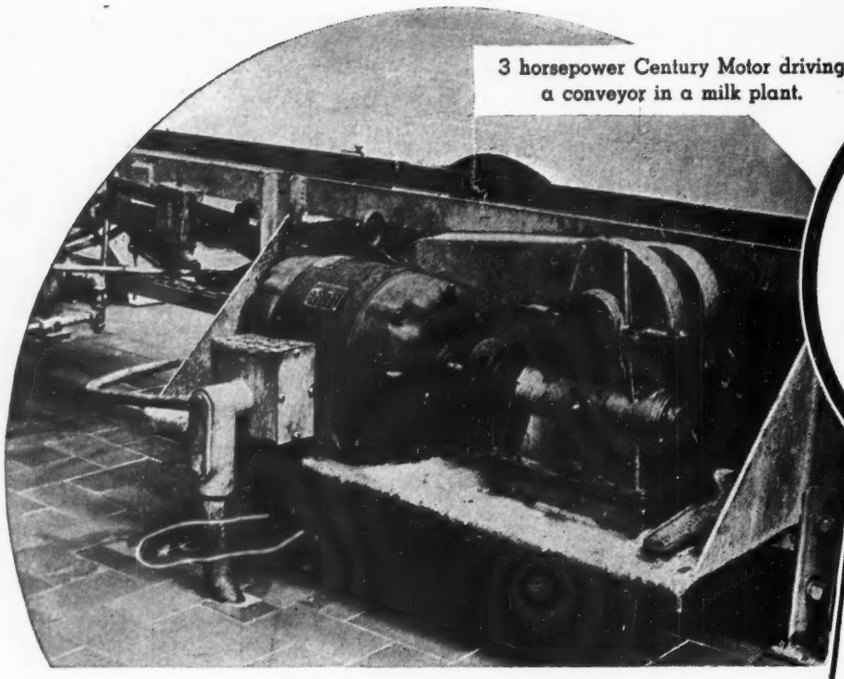
Major Distributors

Major Jobbing Representatives

For sales or service get in touch with the Viking Office nearest your plant: Chicago, Cleveland, Indianapolis, Los Angeles, Milwaukee, Minneapolis, New York, Baltimore, Boston, Buffalo, Cincinnati, Dallas, Detroit, Houston, Kansas City, Kilgore, New Orleans, Philadelphia, Pittsburgh, Richmond, San Francisco, Seattle, St. Louis, Tulsa.

VIKING PUMP COMPANY

CEDAR FALLS, IOWA



3 horsepower Century Motor driving a conveyor in a milk plant.

How It Works:

Location of Cartridge Type Ball Bearing
Solid one-piece, rust resisting cast iron end bracket—the most vital protective part of a Splash Proof Motor.
Wide, large-area air passage assures free entrance and circulation of a large volume of cooling air.
Vertical baffles, cast integrally with the end bracket, prevent entrance of water, liquids or falling objects.

The Specified Motor Performance of Century Splash Proof Motors assures protection against Excessive Moisture, Splashing Water, Falling Solids!

ADVERSE conditions of moisture, frequent plant wash-downs or even falling solids, won't interrupt the continuous performance of Century Splash Proof Motors.

Specified Motor Performance means that you know what to expect from Century Motors properly applied to each individual installation; that you know they meet the load requirements of the machines they drive and stand up successfully under the predetermined operating conditions.

The diagram illustrates how Century engineering has made Century Splash Proof Motors waterproof outside, moisture resisting inside—why these motors stay clean and stay on the job day after day, year after year. Special Century insulations are also available for installations where unusual alkali or acid conditions prevail. In appearance, all Century Motors match the smooth surfaced streamlined trend of modern industrial design.

It will pay you to find out what Century's Specified Motor Performance can mean to your plant—or your product—in terms of long life, dependable performance and money saved. Call in the Century Motor Specialist nearest your office. His years of experience in correct motor application are at your service any time.

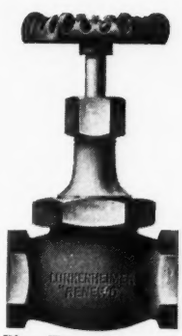
CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Mo.
Offices and Stock points in principal cities

Century MOTORS

One of the Largest Exclusive Motor Manufacturers in the World

For Enduring Service Lunkenheimer Valves

as exactingly made as the finest Food Products

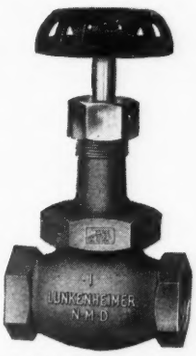


Plug Type "Renewo" Globe Valve

Bronze Gate Valve

"Ferrenewo" Globe Valve

"King-Clip" Gate Valve



"N-M-D" Globe Valve (Non-Metallic Disc)

"Causul" Metal Gate Valve, Monel Trim with Steel Stem

Stainless Steel Needle Valve

Iron Body Gate Valve

Regrinding Swing Check Valve

Lunkenheimer makes a large variety of bronze, iron, steel and anti-acid valves in a wide range of types and sizes. Exactingly made to provide long life with low maintenance expense, they find wide application on Food Industry's many power and process lines.

Those illustrated and many more are shown in the Guide to Better Service, a ready reference in which valves are grouped for your convenience by pressure, type and use. It will prove a valuable aid in solving your valve problems. We will gladly send a copy on request.

ESTABLISHED 1862

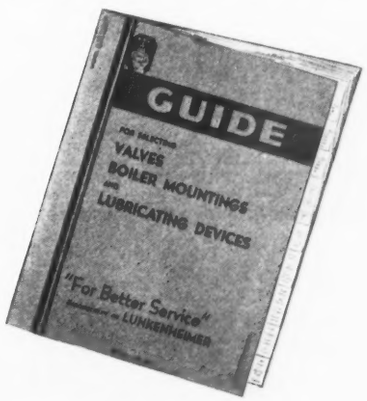
THE LUNKENHEIMER CO.

"QUALITY"

CINCINNATI, OHIO, U. S. A.

NEW YORK CHICAGO
BOSTON PHILADELPHIA

EXPORT DEPT. 318-322 HUDSON ST., NEW YORK



BOILER MOUNTINGS — LUNKENHEIMER VALVES — LUBRICATING DEVICES

28-49A-11

WHERE TO BUY

SUPPLEMENT

For the Food Manufacturer—MATERIALS—For the Food Manufacturer

Let Us Improve Your Powdered Food and Dessert Flavors

We combine good flavoring materials effectively. That, in a few words, sums up the secret of our success in meeting the rigid flavoring requirements of leading powdered dessert and food product manufacturers. By letting us apply this proven technique to your flavoring problem we may be able to furnish you a better and more economical flavor than you are now using. May we work with you toward this end?

FRITZSCHE BROTHERS, Inc.

PORT AUTHORITY COMMERCE BLDG., 76 NINTH AVENUE, NEW YORK, N. Y.

BRANCH STOCKS

BOSTON CHICAGO LOS ANGELES ST. LOUIS TORONTO, CANADA MEXICO, D. F.

Factories at Clifton, N. J. and Stillman Ave., Passaic

DIRECTORY

ADVERTISERS

Key Number		Page
1	Callahan & Co., A. P.	This
2	Eff Laboratories, Inc.	This
3	Fritzsche Brothers, Inc.	This
4	Pfizer & Co., Inc., Chas.	49
5	Stange Co., Wm. J.	This
6	Stein, Hall & Co., Inc.	This
7	Vitamin Technologists Inc.	This

PRODUCTS

	Advertiser's Key No.
Acetic Acid	1
Albumen	6
Caroteen-Vitamin "A"	2
Citric Acid	4
Colors	3, 5
Corn Starch	6
Cream Tartar	4
Dextrines	6
Dry Essence of Spices	5
Egg Albumen	6
Egg Yolk	6
Essential Oils	3
Flavors	3, 5
Granulated Tapioca	6
Pearl Tapioca	6
Rice Flour	6
Sodium Citrate	4
Soya Bean Flour	6
Spice Essential Oils	3
Tapioca Flour	6
Tartaric Acid	4
Vitamin D	7

CAROTENE

(PRO-VITAMIN 'A')

formerly rare and expensive... now available in quantities at low cost.

Provatol (Eff Brand carotene) supplies this valuable health and resistance building food essential now added as a "fortifying" agent to several food and drug successes.

Write for literature and full particulars... no obligation.

GENERAL BIOCHEMICALS, INC.

418-G Republic Bldg. Cleveland, Ohio

Phone: CHerry 5644 • Cable: EFFLAB

"CAROTENE PRODUCTS BY THE GRAM OR CAR"

PEACOCK BRAND

FOOD PRODUCTS SPECIALTIES

Actual Producers of

CERTIFIED FOOD COLORS

Manufacturers of

DRY ESSENCE OF NATURAL SPICES

For condimentation of all food products

Also a complete line of

FLAVORING MATERIALS

Wm. J. Stange Co.

CHICAGO

VITAMIN D

(Irradiated Ergosterol in Sesame Oil)

Vitamin D unitage of 200,000 U.S.P. XI per gram of clear sesame oil for the fortification and enrichment of cereals, infant foods, dairy products, fish liver oils, pharmaceuticals and proprietary products.

New Low Price:

Write for literature, price and full particulars.

Vi-Tech-Oil-D

VITAMIN TECHNOLOGISTS, INC.

947 Maple Avenue Los Angeles, Calif.

Tapioca Flour	Rice Starch
Pearl Tapioca	Potato Starch
Egg Albumen	Rice Flour
Egg Yolk	Potato Flour
Stabilizers	Soya Bean Flour
Corn Starch	Vegetable Gums

Granulated and Flake Tapioca

Pure Food Dextrines

STEIN, HALL & COMPANY, Inc.

285 Madison Avenue, New York

SH

Est. 1866

Boston Philadelphia
Providence Charlotte
Chicago Toronto
Rochester Buffalo
San Francisco Los Angeles

STORAGE

For Frozen Foods

This advertising is offered as a guide to facilities offered by companies all experienced in the proper handling and storing of all types of frozen foods. They will gladly supply information or advice on any storage problems which may be facing you.

PURE VINEGARS

A. P. CALLAHAN & COMPANY

2407 SOUTH LA SALLE STREET

CHICAGO, ILL.

THE NATIONAL COLD STORAGE CO., INC.

Facilities for All Perishable

FROZEN FOOD STOCKS

New York City Area Distribution Made Convenient by Using our

Brooklyn and Jersey City Warehouses

General Offices

19 Hudson St. New York, N. Y.

Walker 5-6743

TERMINAL STORAGE CO.

100-112 W. Seeboth St. Phone—Marquette 7091

MILWAUKEE, WISCONSIN

COOLER, FREEZER AND GENERAL MERCHANDISE STORAGE

Deep Water Dock, Private Siding on C.M.St.P. & P. R.R.

QUAKER CITY COLD STORAGE CO.

PHILADELPHIA, PA.

3 WAREHOUSES 3

Proper Temperatures For Frozen Foods

TWO WORDS

TARTARIC ACID
POWDERED CRYSTAL GRANULAR

CITRIC ACID
POWDERED CRYSTAL GRANULAR

SODIUM CITRATE

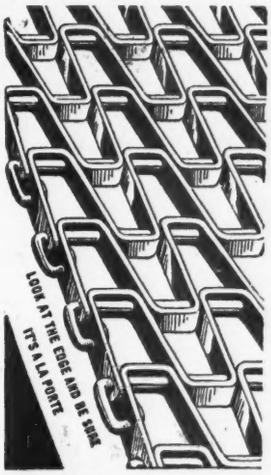
PFIZER QUALITY

THAT SPEAK VOLUMES!

CHAS. PFIZER & CO., INC.
Manufacturing Chemists EST. 1849
81 MAIDEN LANE, NEW YORK
444 W. GRAND AVE., CHICAGO

LA PORTE
FLEXIBLE STEEL CONVEYOR BELTING
Definitely Overcomes the Handicaps of Food Conveying

Stretching, weaving, creeping, jumping and other common conveyor belting faults, that interrupt production and increase processing costs, are eliminated with LA PORTE Flexible Steel Conveyor Belting. This modern, long-wearing belting is engineered to give continuous, trouble-free service on grading, peeling, sorting and picking tables as well as in scalders, washers, cookers, exhausters, elevators, etc. In addition, its perfectly flat surface is ideal for conveying cans, boxes, bottles and other containers empty or filled. It will not deteriorate when not in use and the open mesh feature permits the circulation of air around products in process. Periodical sterilizing with steam or scalding water keeps it highly sanitary.



Furnished in any length and practically any width. Ask your Mill Supply House for La Porte Conveyor Belting TODAY or write to

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

Drives straight
Compression grip protects belt ends
Smooth on both faces
Embeds in belt
Rocker hinge pin
Joint easily separated

ALLIGATOR
for *Extra* belt lacing hours

One of our lunch hour statisticians estimates that two hundred million belts have been laced with Alligator steel belt lacing since its introduction thirty years ago.

If these belts could all tell their story of performance it would be summed up in "*extra* belt lacing hours."

Since the original patent expired there have been many lacings that looked like Alligator. But fortunately for Alligator the making of belt lacing is a highly specialized job. Years of research, backed by thousands of dynamometer tests plus better alloy steels and the constant improvement in die making and stamping practice, have been responsible for these *extra* belt lacing hours.

Every plant should have a supply of Alligator steel belt lacing on hand. Twelve sizes for flat belts of all types up to 5/8" thick. Special lengths for wide belts. Also made in "Monel" and "Everdur." Order from your supply house.

FLEXIBLE STEEL LACING CO.
4612 W. Lexington St., Chicago, Ill.

15 EDITIONS and still going strong

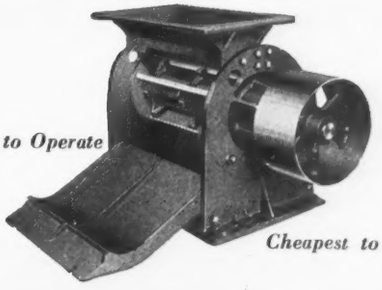
● Here is a 72-page pocket size manual, "Short Cuts to Power Transmission," that presents a wealth of practical information about transmission and conveyor belts. Offers pointers on how to care for belts, methods of lacing, how to repair conveyor belts, etc.
WRITE FOR YOUR COPY

ALLIGATOR
TRADE MARK REG. U.S. PAT. OFFICE
STEEL BELT LACING

EUREKA

Stay .. Sharp .. Long

ROTARY KNIFE CUTTERS



Easiest to Operate

Cheapest to Own

Simple, Positive Regulation

Rugged, hi-quality construction — free, close controlled 'sharp-cut' reduction of drugs, spices, herbs, vegetable roots, beans, stems, shells, cork, charcoal, paper, etc. . . . Little attention required . . . Built in several sizes.

Ask for Catalog I-158

S. HOWES CO., INC., Silver Creek, N. Y.

ADD Low Replacement
AND Low Upkeep
TO GET Real Economy
. . . when you buy
meat spreading pans
YOUR MEATS STAY NICER, TOO,
ON "WEAR-EVER" ALUMINUM PANS

When you equip with "Wear-Ever" Meat Spreading Pans, you can forget about replacements for years. There is practically no wear-out to them. And there's no upkeep whatsoever. Add up those savings and you've got something.

Meat will not spot on these Aluminum pans, nor get an off taste. They resist meat acids. Can't rust — no inhibitor oils necessary. They are easy to wash and keep sanitary. Though strong and durable, they are light and easy to handle.

Used for years by the largest packers in the country, economy, long life, and protection of meat quality have been clearly proved. Facts and figures are available if you'd like them. Use the coupon below.

WEAR-EVER TRADE MARK REG. U.S. PAT. OFF.

"Wear-Ever" ALUMINUM

THE STANDARD: WROUGHT OF EXTRA HARD, THICK ALUMINUM

MAIL THIS COUPON TODAY

The Aluminum Cooking Utensil Co.,
312 "Wear-Ever" Building,
New Kensington, Pa.

Gentlemen:

I would like additional information on "Wear-Ever" Aluminum Meat Spreading Pans. ☐ Have your representative call.

Name_____

Address_____

City_____ State_____

THE TOUGHER THEIR WORK THE BETTER, THEY LIKE IT!

FIG. 150

FIG. 1708

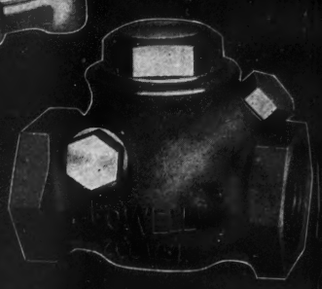


FIG. 560

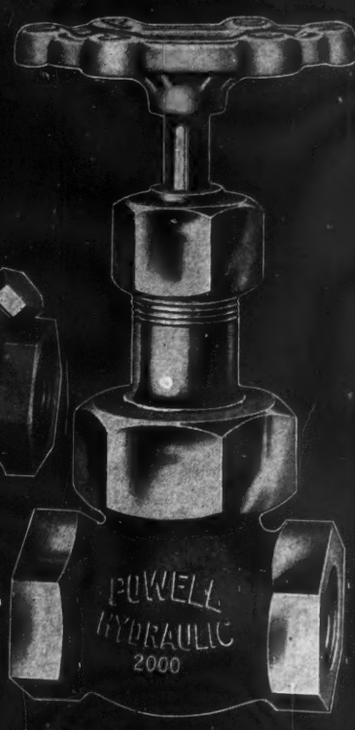


FIG. 1175

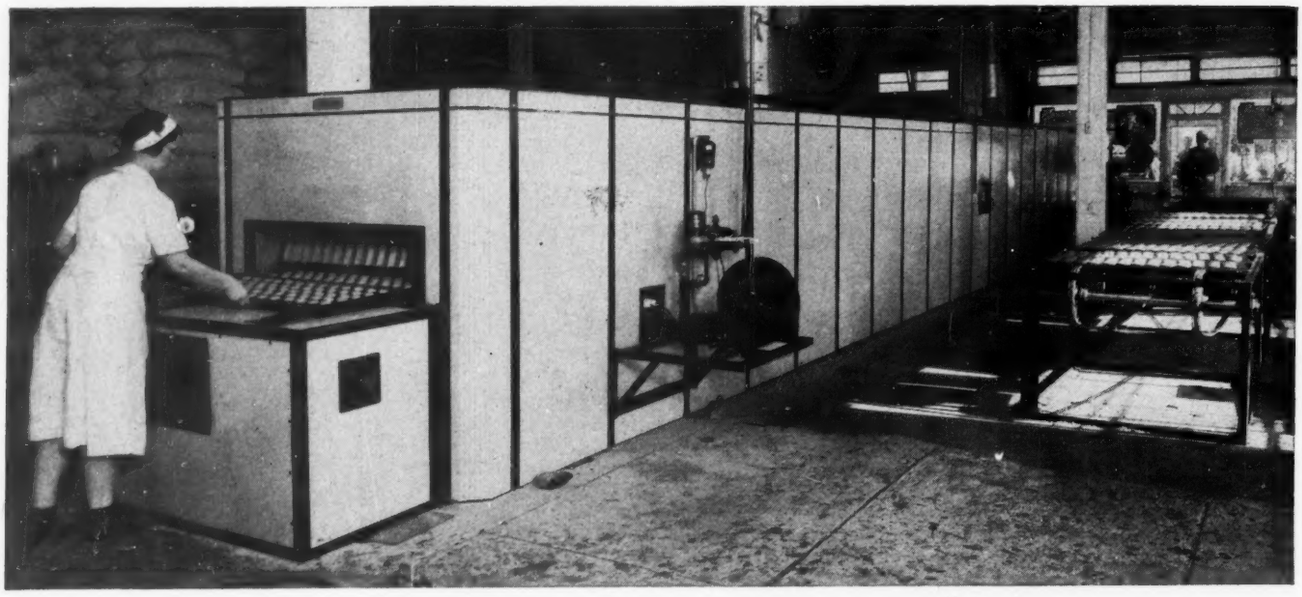
FIG. 158

Controlling your pipe lines and guarding your media is their duty. They were made to handle a tough job. They are eager to prove their ability to give longer, trouble-free performance.

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

Modern GAS Equipment helps cookie firm to *double sales*



Doubled production and sales resulted from installation of modern Gas equipment in the plant of Dad's Cookie Co., Birmingham, Ala. Photograph courtesy Advance Oven Co.

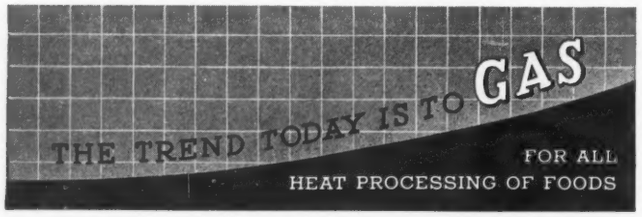
DOWN in Birmingham, Ala., in the plant of Dad's Cookie Co., a new Gas-fired Traveling Oven is making records in production and sales.

In the old ovens it used to take four nights and six days to turn out enough cookies to satisfy the sales force. When the new oven went into production, the time was cut to four days a week until increased business brought it back to six-day production—and the increase is attributed to improved quality. The oven turns out 4,000 pounds of cookies in eight hours.

Gas has played an important part in the greater prosperity of plant and employees—so much so that the business has doubled, requiring a plant expansion. The importance of Gas? Simply, as the plant says, that Gas is the only fuel that can be used to operate in this type of oven efficiently.

Gas enjoys the preference in all kinds of food processing because it is accurately controllable, clean, flexible and speedy, as well as low in cost.

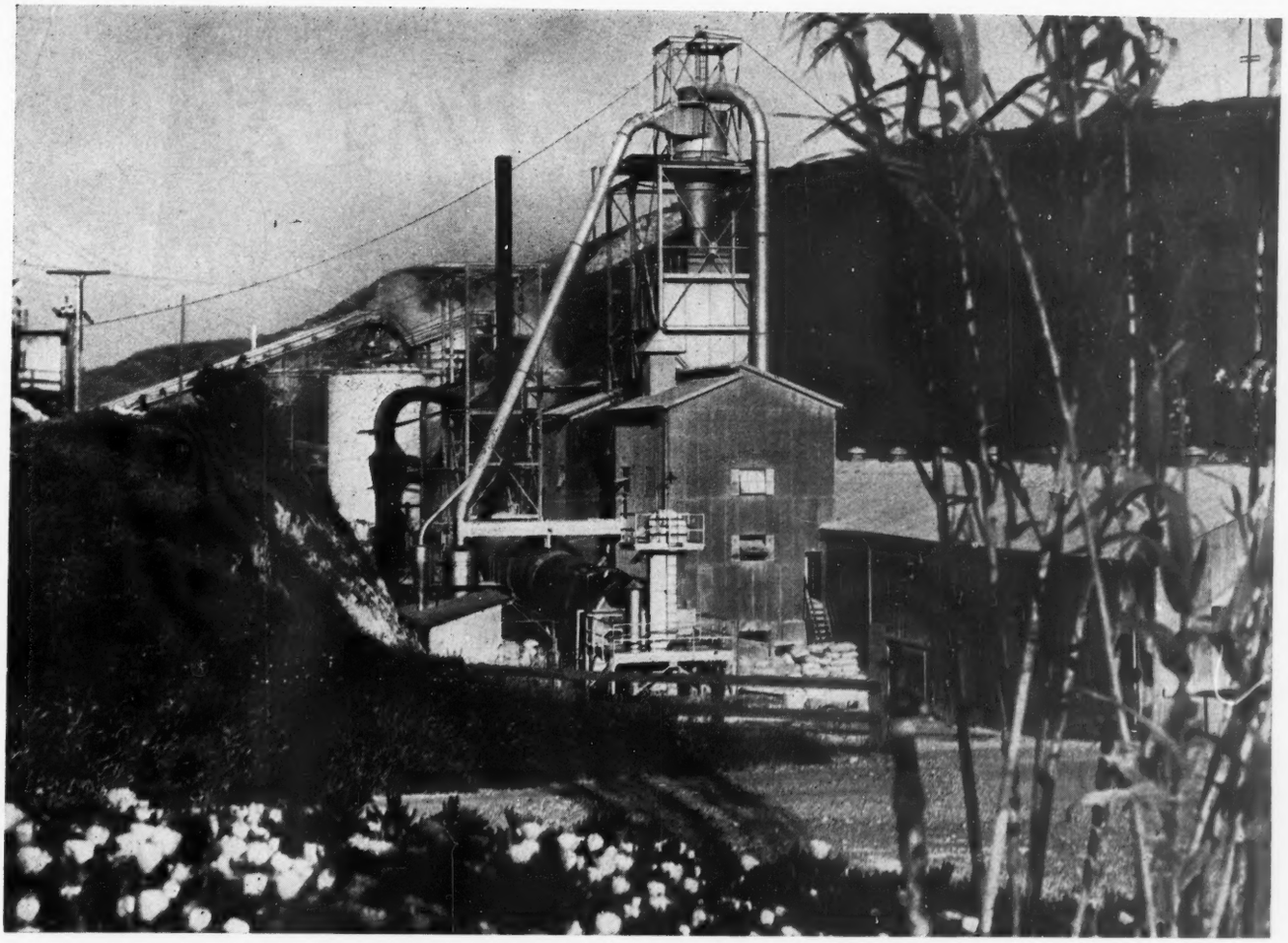
Why not investigate Gas for your own heat processing problems? Your Gas company will be glad to consult with you at any time.



AMERICAN GAS ASSOCIATION

INDUSTRIAL GAS SECTION

420 LEXINGTON AVENUE, NEW YORK CITY



One of DICALITE'S Plants is shown above, nestling in a setting of colorful flowers and vegetation in the hills at Palos Verdes, near Los Angeles, California.

Bring your Clarification Problems to FILTRATION *Headquarters*

LET DICALITE Filtration Engineers tell you *how* you, too, can get *sparkling* CLARITY at *lower* cost per unit of finished product. These men have devoted the major part of their lives to filtration service. They will gladly tell you the story of DICALITE Filteraids and recommend the right grade and amount to meet your operating conditions.

D-I-C-A-L-I-T-E FILTERAIDS INSULATION ADMIXTURE ABSORBENTS FILLERS

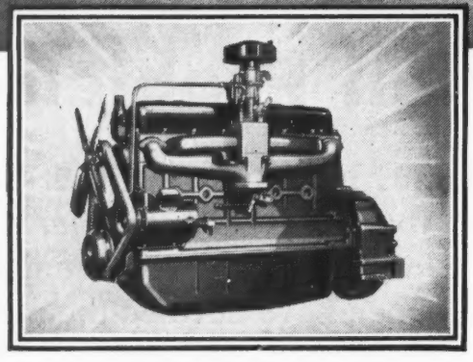
THE DICALITE COMPANY

520 N. Michigan Ave. CHICAGO
120 Wall Street NEW YORK
756 S. Broadway LOS ANGELES

A SUPERIOR QUALITY FILTERAID FOR EVERY FILTRATION NEED

15% to 40% SAVINGS ON GASOLINE say GMC owners

• THE TRUCK OF VALUE •



NO OTHER TRUCK ENGINE

Gets so much work out of gasoline

The GMC SUPER-DUTY is the *peppiest* engine in any comparable truck. Accelerates faster! Pulls better! Does more work on less fuel! And that's just one example of the advanced engineering you'll find throughout in GMC trucks.

LET YOUR GMC DEALER PROVE GAS MILEAGE

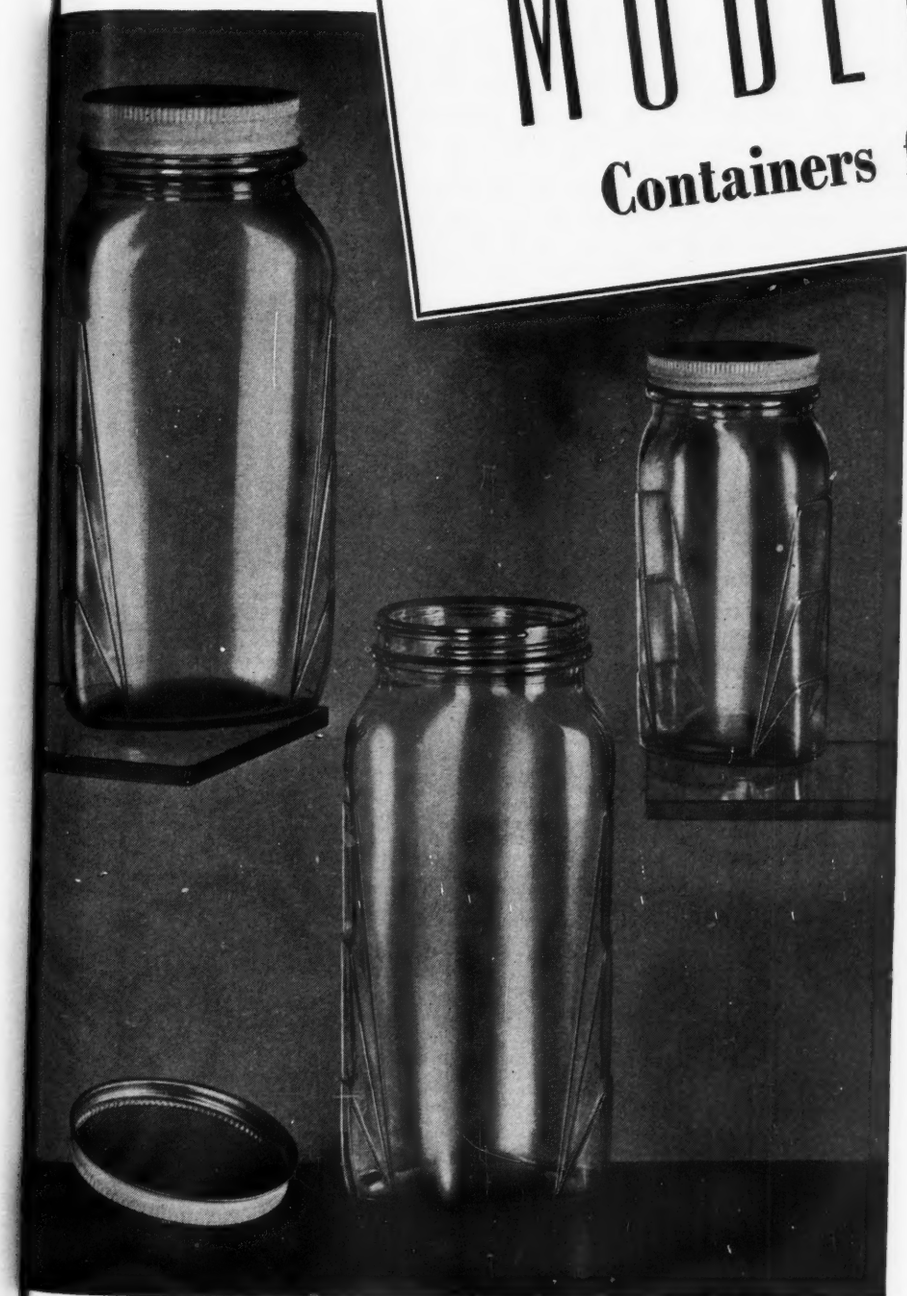
Better than you've ever known before!

You don't have to take anybody's word for it. Your General Motors Truck dealer will gladly make the Mileage Meter Test for you so you can actually see how much you can save with GMC trucks. See him, see this convincing test. Then check GMC prices—they're right down with the lowest!

Our own YMAC Time Payment Plan assures you of lowest available rates

GMC TRUCKS TRAILERS - DIESELS

An Improved, Lighter-weight Line of "MODERNISTIC" Containers for Food Products



OUR "Modernistic" has been one of the most popular food containers ever offered the industry. In redesigning this sparkling glass package, we have kept the appealing beauty, large appearance and ample label space of the Modernistic—and improved it to give you an even finer food container.

Our packaging experts and glass engineers have made the *new* Modernistic lighter in weight, without sacrificing necessary strength at any point. That means lower costs all along the line.

The *new* Modernistic has straight sides, an aid to production-line speed and efficiency.

The *new* Modernistic is made in all popular sizes, offering a means of giving identity to a whole family of products. There is an economical, handsome and convenient O-I closure for every size.

Ask your Owens-Illinois salesman to show you the *new* Modernistic line at once. This gleaming glass package will help you make business fine in Forty! Owens-Illinois Glass Company, Toledo.

COMPLETE PACKAGING SERVICE—CONTAINERS—TUMBLERS—CLOSURES—SHIPPING CARTONS

OWENS-ILLINOIS
GLASS COMPANY
First in Glass

It Will Pay You to Investigate THIS NEW IMPROVED LATHAM BOTTOM STITCHER

Improved Latham
No. 34B Bottom Stitcher

A background of 54 years of experience is built into the Improved Latham Bottom Stitcher. Moderately priced, it has many features found only in the highest priced stitchers. Its high speed, and convenience of operation make it a profitable stitcher for bottom stitching the lighter grades of corrugated and solid fibre shipping containers in all the usual sizes.

Some of its Improved Features are: All working parts concealed, protecting them from dust and dirt. All castings are heavier. Heavy duty working parts are larger and stronger than those of previous models. Formers and driver are readily removable, and reversible, doubling their length of service. Stitcher head is removable as a unit, for quick servicing. Reliable ring type clutch. Wider opening between Stitcher head and clincher aids in handling work. Single foot pedal operates both post and stitcher head. Heavy spring in post provides for variations in thickness. The adjustable light is a practical aid in operation of the stitcher, and for making adjustments.

Operates at speeds up to 300 stitches per minute. Throat length 12".

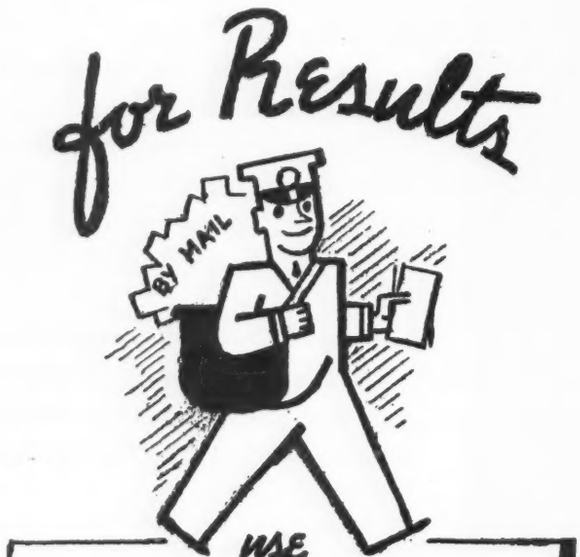
Ask for our representative who will tell you more about its many convenient adjusting and operating features.

Regular Slotted Container
Bottom Stitcher

DEXTER FOLDER COMPANY

330 West 42nd St., New York, N. Y.

BOSTON, 185 Summer St. CHICAGO, 117 W. Harrison St. PHILADELPHIA, 5th and Chestnut Sts.
CINCINNATI, 3441 St. Johns Place SAN FRANCISCO LOS ANGELES
SEATTLE, Harry W. Brintnall Co. DALLAS, J. F. Carter, 5241 Bonita Ave.



McGRAW-HILL
DIRECT MAIL LISTS

As business paper publishers for over fifty years, McGraw-Hill is uniquely equipped to offer complete, authoritative direct mail coverage of Industry's major markets. Extreme accuracy is maintained (guaranteed to 98%) and through careful analysis of markets, complete classification of companies and personnel, etc., the widest possible selections are available. Send for handy reference folder "Hundreds of Thousands of Reasons Why" which describes how McGraw-Hill Lists are built and maintained.

• What Fields Do You Want to Reach? •

Aviation Industry
Bus & Transit Industries
Business Executives
Chemical Process Industries
Civil Engineering & Construction
Coal Mining
Electrical Appliance Dealers
Electrical Contractors
Electrical Industry
Electrical Wholesalers
Food Industries
Manufacturing Industries
Metal Mining
Metal Working Industries
Mill Supply Distributors
Power Engineers
Product Engineers
Radio Dealers & Wholesalers
Radio Engineers
Textile Industries

For further details, selections from above basic classifications, counts, prices, etc., or estimates on special lists . . . ask any representative or write to

DIRECT MAIL DIVISION . . . .
McGRAW-HILL PUBLISHING CO.
330 W. 42nd STREET NEW YORK, N. Y.

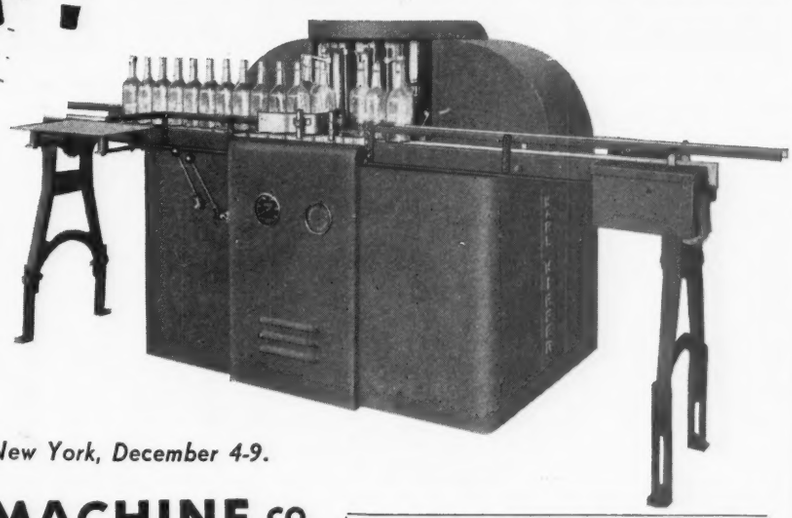
. . . Complete lists covering industry's major markets

—new and different!

KIEFER ROTARY CLEANER

for

HI-SPEED INVERTED BOTTLE CLEANING



Where cleaning of Bottles in the inverted positon is in vogue, Kiefer's "Bottoms Up" assures smooth operation free from glass breakage.

Continuous motion and in synchronization with the filler! Equipped with varable speed drive—safety controls—speed indicator—auxiliary air filter.

On exhibition at the Chemical Show, New York, December 4-9.

THE KARL KIEFER MACHINE CO.

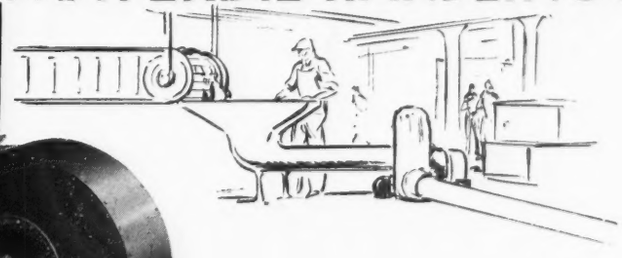
NEW YORK
BOSTON
CHICAGO

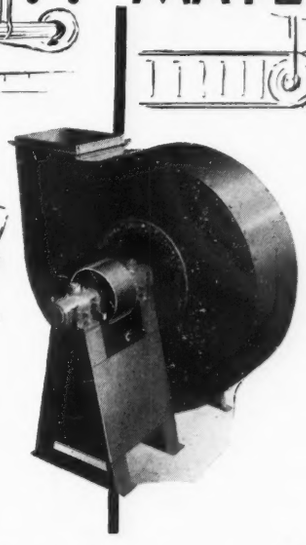
CINCINNATI, U. S. A.
LONDON, ENGLAND

SAN FRANCISCO
SEATTLE
LOS ANGELES

We build full automatic—semi-automatic—hand-fed equipment for cleaning, filling, closing and conveying bottles, jars and tins. Filters, pumps, percolators.

DUST REMOVAL?... MATERIAL HANDLING?





USE "Buffalo"

STEEL PLATE EXHAUSTERS

These rugged smooth-running Buffalo Fans have solved the dust and other waste removal problems in many food plants. You'll also find them equally useful in conveying many materials in process of manufacture.

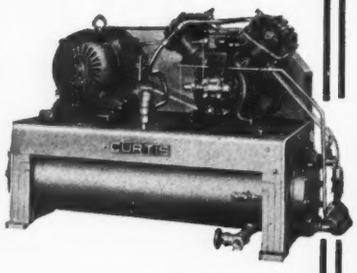
Fans are adjustable and reversible. Any size you may need. Write for Bulletin 410-F.

BUFFALO FORGE COMPANY
181 MORTIMER ST. BUFFALO, N. Y.

Branch Engineering Offices in Principal Cities
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

You Get Low Cost Food Processing with

CURTIS REFRIGERATION AIR CONDITIONING AND COMMERCIAL



CURTIS Condensing Units—the most important part of any air conditioning, refrigerating or freezing system—are delivering dependable, trouble-free service in food processing plants the world over. For Curtis equipment is quality built throughout. Curtis leadership is apparent in every detail of design and construction, reflecting eighty-five years of successful manufacturing experience; you'll find it in the high efficiency, silent, vibrationless operation and low-cost economical performance of every Curtis Unit. There's a Curtis model to exactly balance your refrigeration or air conditioning requirements. Specify Curtis—and be sure of satisfaction.

CURTIS REFRIGERATING MACHINE CO.
1992 Kienlen Avenue, St. Louis, U. S. A.
"Builders of Condensing Units Since 1922"

MODERN INSECT CONTROL

ELECTRICALLY-MADE VAPOR QUICKLY ELIMINATES *Roaches*

THE WEST SANITOR

This centrifugal vaporizer is simple to use. Just pour Vaposector fluid into electric machine and plug into light socket. The Sanitor does the rest! . . . Fine mist, so created, penetrates into every crack and crevice where air will go and finds the insect wherever it may be.

ODORLESS VAPOSECTOR FLUID

Economical and highly effective against *Roaches, Flies, Mosquitoes, Spiders* and similar insects. Leaves no mess behind. Very little material required.

Write for our free booklet on Insect Control

WEST DISINFECTING COMPANY
Dept. F, 42-16 West Street — Long Island City, N. Y.
"Largest Organization of its kind in the World"

WHERE TO BUY
SUPPLEMENT
EQUIPMENT

PROFESSIONAL SERVICES

Consulting—Plant Design—Research—Testing
Chemical, Bacteriological and Nutritional Analyses

HALLENBECK
Inspection and Testing Laboratory
Analytical and Consulting Chemist
Specialists—Foods—Fuels—Oils
Francis Bldg., 56-62 Pearl St.
Buffalo, N. Y.

FOOD RESEARCH LABORATORIES, Inc.
RESEARCH—ANALYSIS
CONSULTATION
Specialists in Vitamins
WRITE FOR "SCIENCE AT YOUR SERVICE"
114 E. 32nd St., NEW YORK

A Survey of food sources, methods of handling and manufacture
FOOD TECHNOLOGY

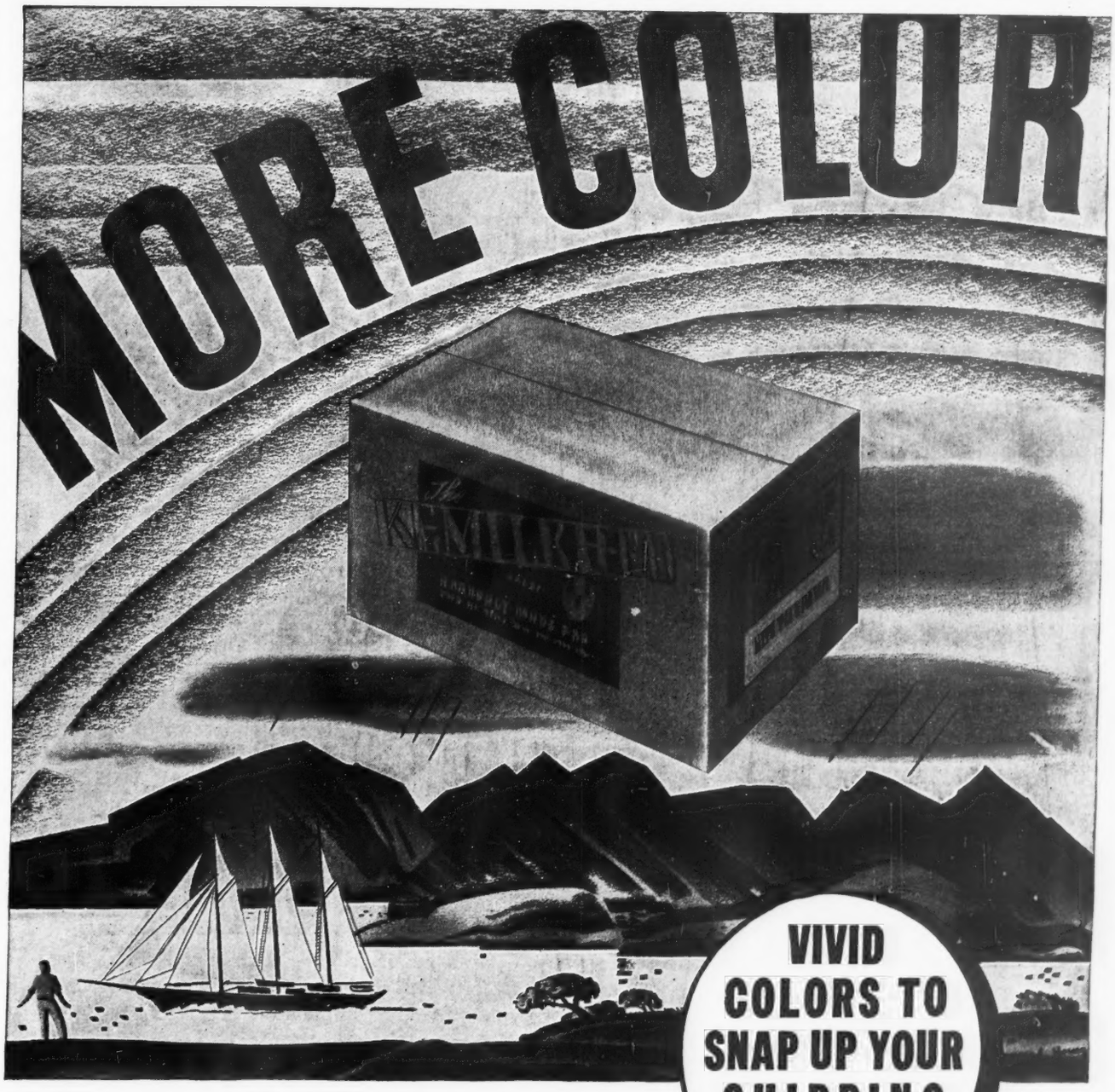
By S. C. PRESCOTT and B. E. PROCTOR,
Massachusetts Institute of Technology
630 pages, 6 x 9, illustrated, $5.00

THIS book describes the great modern food laboratories. Special features of the work are the emphasis on biological and technological chemistry and sound treatment of refrigeration, canning, dairy products, quick freezing, etc. Mail the coupon for 10 days' examination on approval.

McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City

Send me Prescott and Proctor, Food Technology for 10 days' examination on approval. In 10 days I will send $5.00, plus few cents postage and delivery, or return book postpaid. (We pay postage on orders accompanied by remittance.)

Name .....
Address .....
City and State .....
Position .....
Company .....F Food-12-39
(Books sent on approval in U. S. and Canada only)



Do your shipping boxes have the snap and sparkle that attract attention to your product in transit, on shelves and counters, in display windows? If not, give them *more color.* Colorful shipping boxes attract the eye, advertising products throughout distribution. Your shipping boxes will better advertise, display and sell your product . . . if they are designed in the H & D Packaging Laboratory.

The Hinde & Dauch Paper Company
3909 Decatur St. Sandusky, Ohio
Factories in Principal Cities.

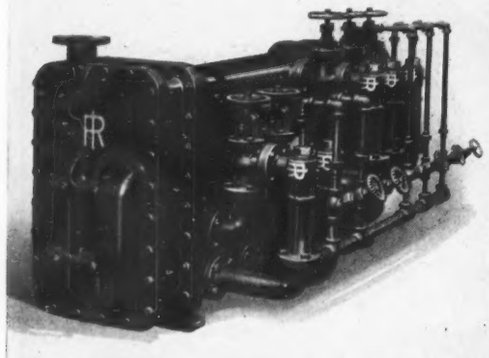
Send for FREE Booklet

"IDEAS For Corrugated Shipping Boxes" may contain just the idea you've been looking for . . . the idea that will mean more advertising, more merchandising and more sales for your product. Send for your free copy today.

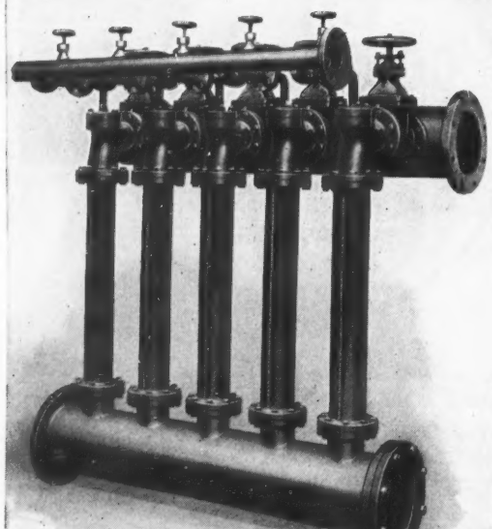
HINDE & DAUCH

SHIPPING BOXES MOVE MERCHANDISE

Two-stage, single-element ejector with combined surface-type inter- and aftercondenser often used with evaporating equipment.



Two-stage, multiple-element ejector with combined surface-type precooler, inter- and aftercondenser as supplied with surface condensers.



Above—Multiple-element, single-stage ejector providing variable capacity for moderate vacuum applications.

Right—Large booster ejector and counter-current barometric intercondenser for service with a vacuum still.

I-R Steam-Jet Ejectors MAINTAIN HIGHER VACUUMS AT LOWER COST

I-R Steam-Jet Ejectors are ideal for industrial processes where high vacuums are an important requirement. The many I-R Ejector installations in food plants, sugar and oil refineries, textile mills, canneries, breweries, chemical plants, paper mills, etc., demonstrate the success and popularity of these units.

Steam-Jet Ejectors have no moving parts—therefore, require no lubrication, and practically no attention, resulting in minimum operating and maintenance costs.

Compared with mechanical vacuum pumps, ejectors are lighter, occupy less space, eliminate vibration, and can be mounted in any convenient location.

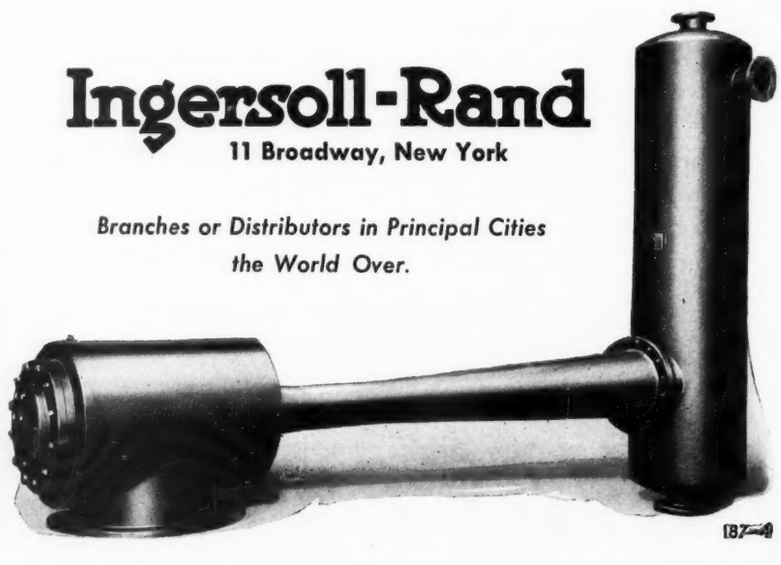
Economy of operating steam is assured by the wealth of engineering experience and data behind I-R Ejectors, and by the wide range of standard sizes and types which permits the selection of the most efficient unit.

Ingersoll-Rand builds single-, two-, and three-stage ejectors, any of which may be of the single- or multiple-element type with any combination of precoolers, inter- or aftercondensers of the direct-contact or surface type as required. There is a suitable ejector combination to meet the needs of practically every industrial vacuum process.

Ingersoll-Rand

11 Broadway, New York

Branches or Distributors in Principal Cities the World Over.



IBZ-4

Catalogs of Food Equipment

Shown at 17th Exposition of Chemical Industries

This Order Form Will Save You Time

If you want more information on equipment shown at the Chemical Show, mark the numbers of the desired catalogs on the coupon on the reverse of this page. Send the coupon to FOOD INDUSTRIES with your name and address correctly filled in. Mail to FOOD INDUSTRIES before Jan. 15, and we will forward your request for catalogs to the manufacturers of the products named.

CONTROLLING AND MEASURING

1. **CONTROLLERS**—Nine advantages of its new line of air-operated controllers are listed in a recent bulletin by The Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

2. **RECORDER**—A multiple potentiometer for recording in multi-color and numerals on one chart where temperatures overlap, is described and illustrated in a recent folder, by The Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

3. **THERMOMETERS AND GAGES**—Redesigned thermometers and pressure gages are presented in a new bulletin, by The Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

4. **TRANSMISSION SYSTEM**—Bulletin 94-3, of The Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa., deals with pneumatic transmission of measurement and control in hazardous atmospheres.

5. **METERS**—Various types of Niagara meters for measuring and recording flow of a liquid through a pipe are described in a 16-page illustrated bulletin, by Buffalo Meter Co., 2917 Main St., Buffalo, N. Y.

6. **FLUID ANALYZER**—The new R-S photometer for analyzing any transparent fluid by monochromatic light from any region of the spectrum is introduced in a recent broadside, by Coleman Electric Co., Inc., 310 Madison St., Maywood, Ill.

7. **INDUSTRIAL INSTRUMENTS** — Charles Engelhard, Inc., Chestnut St. and N. J. R. R. Ave., Newark, N. J., has published a series of bulletins on industrial instruments including pyrometers, and thermocouples.

8. **FLOW METER**—Fischer & Porter Co., 110 W. Penn St., Germantown, Philadelphia, Pa., have issued 28-page illustrated Bulletin 103-B on the rotameter for measuring flow of any liquid, vapor or gas.

9. **SCALES**—Condensed Catalog No. 7, of The Kron Co., Bridgeport, Conn., contains 16 illustrated pages of information on various types of industrial dial scales.

10. **RECORDERS**—Leeds & Northrup Co., 4907 Stenton Ave., Philadelphia, Pa., introduces the "Electro-Chemograph" for recording dropping mercury electrode applications in the chemical analysis of products, in technical publication, E-94 (1), and the new Micromax equipment for controlling SO_2 production, in Folder N-91 (1).

11. **TEMPERATURE REGULATOR** — Instructions for installation and operation of electric temperature regulator, Type SE, are presented in Bulletin 158, by Sarco Co., Inc., 183 Madison Ave., New York, N. Y., with engineering data in Bulletin 456.

12. **pH CONTROLLER**—The new slide comparator for expressing and recording acidity and alkalinity by establishing pH control is featured in a recent 4-page bulletin, by W. A. Taylor Co., Inc., 872 Linden Ave., Baltimore, Md.

13. **BALANCES**—Various balances for laboratory and industrial work, including Christian Becker keyboard analytical balance No. 708A, are described in three folders, of The Torsion Balance Co., 92 Reade St., New York, N. Y., namely: Bulletins No. 549, 653 and 662.

14. **CONTROLLERS**—Temperature, control and indicating, and safety instruments are discussed in a series of bulletins, by Wheelco Instruments Co., 1929-1933 So. Halsted St., Chicago, Ill.

DISINTEGRATING

15. **CUTTERS**—Equipment performance of rotary cutters is discussed in 4-page illustrated Bulletin No. 45, by Abbé Engineering Co., 50 Church St., New York, N. Y.

16. **GRINDING MILLS**—Raymond Pulverizer Division, Combustion Engineering Co., Inc., 1315 N. Branch St., Chicago, Ill., has published three illustrated bulletins on mills, including: Catalog No. 33 on high-side type roller mills, Bulletin No. 39 on screen mills, and Catalog No. 43 on bowl mills for direct firing rotary kilns.

17. **COLLOID MILLS**—Catalog No. 20, of Eppenbach, Inc., 45-10 Vernon Blvd., Long Island City, N. Y., covers industrial and laboratory colloid mills, including statistical data and cross-sections.

18. **COLLOID MILLS**—Premier Mill Corp., Geneva, N. Y., has issued a 24-page illustrated catalog, entitled "The Premier Colloid Mill," complete with engineering data, industrial applications and operation.

19. **PULVERIZERS** — "Mikro-Pulverizers" for grinding or processing food products, "Bantam Mikro-Pulverizer" for laboratory and small production jobs, and the new "Mikro-Pulverizer" for disintegrating and sizing moist, plastic materials, are discussed in three catalogs, by Pulverizing Machinery Corp., Valley Rd. near Westfield Ave., Roselle Park, N. J.

20. **CRUSHER**—Bulletin 1800, of Sprout, Waldron & Co., Muncy, Pa., describes the "Precision" saw tooth crusher and lists eight advantages of its use.

DRYING

21. **DRYERS**—A general catalog on rotary dryers for foods and other products, complete with illustrations and tables, has been issued by Louisville Drying Machinery Corp., Inc., Louisville, Ky.

22. **DRYERS**—The new electrically-heated dryer for laboratory use and drying machines for handling various food products are discussed in Bulletins No. 278 and 158, respectively, by Proctor & Schwartz, Inc., Seventh St. and Tabor Rd., Philadelphia, Pa.

FILTERING

23. **FILTERS**—Engineering data on the new self-cleaning "Electromatic" filter for air cleaning is presented in 8-page illustrated Bulletin No. 250, by American Air Filter Co., Inc., Louisville, Ky.

24. **FILTERS** — The new Seitz Tank Hercules for fine filtrations, the single disk Junior filter No. 40-1 for filtrates in volumes up to 100 gal. per hour, and "Standard" sheet filters for clarifying and sterilizing purposes, are discussed in three bulletins by American Seitz Filter Corp., 480 Lexington Ave., New York, N. Y.

25. **CORD FILTER**—Filtration Division, Louisville Drying Machinery Corp., Inc., Louisville, Ky., introduces a continuous, self-cleaning filter, the "Louisville Wright Cord Filter," for food products clarification and brewers' mash extraction, in a recent bulletin.

26. **FILTERS**—"Pur-O-lators" for industrial and machine filtration of food products are the subject of 24-page Section 8, published by Motor Improvements, Inc., Newark, N. J.

27. **FILTERS**—General data on the Sweetland pressure filter and the Oliver Precoat filter installations for clarifying sirupy products are given in Bulletins No. 11 and 209, respectively, by Oliver United Filters, Inc., 33 W. 42d St., New York, N. Y.

MATERIALS HANDLING

28. **MATERIALS HANDLING EQUIPMENT** —Junior Catalog 639, of Barrett-Cravens Co., 3262 W. Thirtieth St., Chicago, Ill., shows a complete line of materials handling equipment using all over-head space.

29. **CONVEYORS**—Bulletin No. 13 on conveyors for handling bottles, cans, boxes, or similar packages or containers, has been issued by Horix Manufacturing Co., Corliss Station, Pittsburgh, Pa.

30. **MATERIALS HANDLING EQUIPMENT** —Lewis-Shepard Sales Corp., 245 Walnut St., Watertown (Boston), Mass., has published various bulletins dealing with materials handling equipment, including: stacker, lift truck, skid, wagon truck, carboy truck, bottlers' case truck, and floor protective wheels.

31. **FLOOR TRUCKS**—Nutting Truck Co., Inc., 1125 W. Division St., Faribault, Minn., has issued 96-page illustrated indexed General Catalog No. 37 on floor trucks, wheels and casters.

32. **MATERIALS HANDLING EQUIPMENT** —Vertical and inclined screw elevators and conveyors are described in 8-page Bulletin No. 44 and 64-page Catalog No. 43A, of Robinson Mfg. Co., Muncy, Pa.

33. **CONVEYORS**—Redler conveyors and elevators, materials handled and advantages of application in particular industries are the subject of Catalog 4238, of Stephens-Adamson Mfg. Co., Aurora, Ill.

34. **TRUCKS**—The Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia, Pa., has issued a 60-page illustrated catalog showing a complete line of electric industrial trucks, hand lift trucks and skid platforms.

MIXING

35. **MIXERS**—Full details on construction and operation of Abbé-Lenart mixers are given in 8-page illustrated Bulletin 43, by

Abbé Engineering Co., 50 Church St., New York, N. Y.

36. **MIXERS**—Eppenbach, Inc., 45-10 Vernon Blvd., Long Island City, N. Y., has issued Catalogue No. 23, dealing with "Homo-Mixers" available in a variety of materials.

37. **MIXERS**—A new line of "Vortex" mixers, available in all sizes from ½ h.p. to 50 h.p., is presented in Bulletin D-52, by Lawrence Pump and Engine Co., P. O. Box 70, Lawrence, Mass.

38. **MIXERS**—Catalogs B-66 and B-65 of Mixing Equipment Co., Inc., 1088 Garson Ave., Rochester, N. Y., present "Lightnin" side entering mixers of four general types, and "Lightnin" portable mixers for use in processing.

39. **MIXERS**—Mixers for industrial purposes form the subject of 20-page illustrated Bulletin No. 503, of Industrial Division, Ransome Concrete Machinery Co., Dunellen, N. J.

40. **MIXERS**—"Gardener" mixers for ordinary mixing requirements and "Unique" mixers for specific applications are described in illustrated Catalog No. 32-E, by Robinson Mfg. Co., Muncy, Pa.

41. **MIXERS**—A complete line of mixing and blending machinery is covered in 32-page illustrated Catalog F, No. 1036, by Sprout, Waldron & Co., Inc., Muncy, Pa.

42. **TURBO-MIXERS**—Information on various types of equipment, including turbo-mixers, gas-absorbers, and agitators, is given in a series of bulletins issued by The Turbo-Mixer Corp., 247 Park Ave., New York, N. Y.

PACKAGING

43. **SHIPPING**—Two recent bulletins of Acme Steel Co., 2840 Archer Ave., Chicago, Ill., show how profit leaks beyond the production line can be stopped by "Unit-Load" bracing process for carload shipment.

44. **TAPE SEALER**—Bemis Bro. Bag Co., 601 S. Fourth St., St. Louis, Mo., has issued an 8-page booklet describing a tape sealer for closing open-mouth multiwall bags.

45. **LABELER** — Photographs, cross-sections and data on automatic "Straightway" labelers are presented in a bulletin by Economic Machinery Co., Worcester, Mass.

46. **FILLING MACHINES**—Horix Manufacturing Co., Chartiers Ave. at Oliffe St., Corliss Station, Pittsburgh, Pa., present their line of filling machines, including: Model H-B 18-tube automatic high speed rotary filling machines: Model M 3 and 4-tube table type filling machines; 4- and 6-tube straight-line filling machines; Model T-R 4-tube bench type filling machine; Model P-R 4-tube pulp filling machine; Model HS-12 12-valve automatic high-speed rotary filling machine; and Model H-S 18-tube automatic high-speed rotary filling machine, in 2-page Bulletins No. 1, 4, 5, 6, 9, and 12.

47. **PACKAGE FILLING MACHINES**—Model "J" hand operated filling machines for filling ice cream into small containers, Model "C" for handling cream, cheese, or ice cream, Model "M" for one or two flavors of ice cream, and Model "H" for one flavor only, are introduced in recent illustrated bulletins by Horix Manufacturing Co., Pittsburgh, Pa.

48. **PACKAGING AND FILLING**—Various types of packaging and bottle filling equipment are illustrated in a 16-page catalog, by The Karl Kiefer Machine Co., Cincinnati, Ohio.

49. **LABELING**—Four types of "Labelrites" for gluing label edges to container, and "Pony" table gummers for applying adhesives to sheet material are discussed in recent bulletins, by New Jersey Machine Corp., 1502 Willow Ave., Hoboken, N. J.

50. **PACKAGING**—Stokes & Smith Co., 4928 Summerdale Ave., Philadelphia, Pa., have issued "Packagers Digest," showing a complete line of packaging equipment.

51. **FILLER**—A new high-speed volumetric filler on a "pay-as-you-package-plan" is featured in a folder issued by Triangle Package Machinery Co., 906-910 Spaulding Ave., Chicago, Ill.

52. **WEIGHING FILLER**—Triangle Package Machinery Co., 906-910 N. Spaulding Ave., Chicago, Ill., announces the new "Electric-Tri-Pak" weigher and filler with dial controlled electric fingers, in a 4-page bulletin.

53. **SHIPPING CONTAINERS** — Wheeling Corrugating Co., Wheeling, W. Va., has issued a 24-page illustrated catalog, entitled "Steel Shipping Containers."

SEPARATING

54. **SIFTERS**—Bulletin No. 41A, of Abbé Engineering Co., 50 Church St., New York, N. Y., introduces the "Bluegrass" sifter claimed to speed up sifting performance 2 to 10 times faster than any other machine.

55. **CENTRIFUGAL**—Information on design, speeds, and dimensions of Tolhurst suspended centrifugal for various processing applications, is given in a recent illustrated bulletin, by Tolhurst Centrifugal Division, American Machine and Metals, Inc., 100 Sixth Ave., New York, N. Y.

56. **EXTRACTOR**—Tolhurst Centrifugal Division, American Machine and Metals, Inc., 100 Sixth Ave., New York, N. Y., has published a folder on the new "Center Slung" extractor designed especially for textile mill use.

57. **SEPARATORS**—Catalog No. 30, of Raymond Pulverizer Division, Combustion Engineering Co., Inc., 1315 N. Branch St., Chicago, Ill., discusses mechanical air separators with patented whizzers.

58. **SEPARATORS**—The Exolon Co., Blasdell, N. Y., introduces Type "C" double 30 magnetic separator, in a recent 4-page bulletin.

59. **CENTRIFUGALS**—Complete construction data on 12-in. standard laboratory centrifugal and motor driven suspended centrifugals is given in illustrated Bulletins 48 and 41A, respectively, by Fletcher Works, Glenwood Ave. and Second St., Philadelphia, Pa.

60. **UNLOADERS**—"Centroid" control for slow basket speed in unloading operations, heavy-duty unloader plow for removing solid cake from wall of basket, and "junior" unloader for testing unloadability of doubtful cakes, are the subject of Bulletins 44 and 43, of Fletcher Works, Glenwood Ave. and Second St., Philadelphia, Pa.

61. **SIFTERS**—Five recent bulletins of Great Western Mfg. Co., Leavenworth, Kan., deal with Combs gyrating sifting machines, screening machines, and bolter for sifting practically any material.

62. **SCREENS**—Two new bulletins of Productive Equipment Corp., 4600 South Kedzie Ave., Chicago, Ill., describe engineering features of "Selectro" vibrating screens for food processing.

63. **SIFTER**—In 10-page illustrated Bulletin B-2, Sprout, Waldron & Co., Muncy, Pa., present "Perfect Circle" sifter for separating a variety of products by screening.

64. **SEPARATORS**—Specific gravity separators and wheat germ separator are discussed in two recent publications of Sutton, Steele & Steele, Inc., Dallas, Tex.

STORING

65. **TANKS**—"Sani-I-Tanks", available in three standard sizes, are featured in 20-page illustrated Catalog A-38, by Metal-Glass Products Co., 155 E. 44th St., New York, N. Y.

66. **TANKS**—Stainless steel storage and mixing tanks are described with specification data in Bulletin No. 785, by The Pfaulder Co., Rochester, N. Y.

67. **STORAGE CONTROL**—The "Tellevel" automatic storage control for starting and stopping conveyors, feeding bulk materials to bins or hoppers, is discussed in Bulletin 1239, by Stephens-Adamson Mfg. Co., Aurora, Ill.

UNCLASSIFIED

68. **PROCESSING EQUIPMENT**—Catalogue 238, of The Alsop Engineering Corp., Milldale, Conn., covers processing and handling equipment for mixing, filtering, filling, conveying, labelling and capping.

69. **CORROSION RESISTING EQUIPMENT**—A recent 26-page illustrated catalog of Lee Metal Products Co., Inc., Philipsburg, Pa., presents full details on types and sizes of stainless steel, pure nickel and Monel metal corrosion resisting equipment of general use in canning and other food processing plants.

70. **STEEL EQUIPMENT**—Lukens Steel Co., Coatesville, Pa., announces nickel-clad corrosion resistant steel, in a 22-page publication, complete with application data, dimensions and price; and vol. 1, No. 3 and No. 4 of "Clad News" dealing with Inconel-clad steel and Monel-clad steel.

71. **GLASS LINED EQUIPMENT**—A complete line of glass lined steel equipment for use in brewing, dairying, distilling, ice cream making and food processing, is discussed in 24-page illustrated Catalogs 757 and 758, by The Pfaulder Co., Rochester, N. Y.

72. **PROCESSING EQUIPMENT**—Read Machinery Co., Inc., York, Pa., has published 16-page Bulletin No. 39304, illustrating various types of chemical and industrial equipment.

73. **PROCESSING EQUIPMENT** — Catalog No. 36-E dealing with crushers, cutters, grinders, hammer mills and pulverizers; and Bulletin No. 41-D on gyro-sifters, have recently been issued by Robinson Mfg. Co., Muncy, Pa.

Detach along these lines and mail to Food Industries

MAILING COUPON—GOOD TILL JAN. 15 ONLY

FOOD INDUSTRIES, 330 West 42nd St., New York, N. Y.

I have circled below the catalogs I want.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72	73							

My Name ..... Title .....

Company .....

Street .....

City & State .....

SEND THIS COUPON TODAY

Please state here industry engaged in or principal product

.....

.....

NEW *All-Stainless* PROCESS

JUICES 2000 ORANGES A MINUTE!

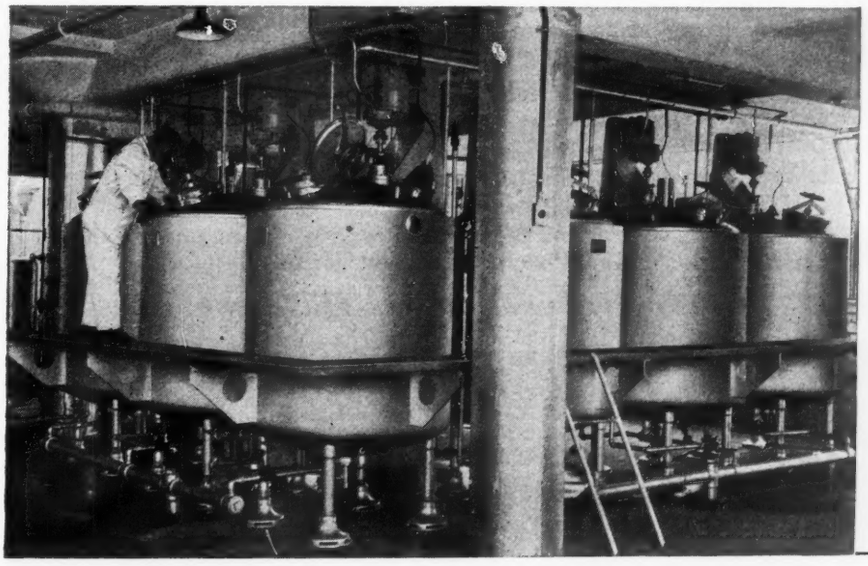
JUICING oranges on a mass-production basis is a job that calls for the newest and finest in food-handling equipment. This new plant consumes fruit at the rapid rate of 2000 oranges a minute, or 200 tons a day. Yet with this volume of production, the fresh flavor of the juice receives the surest protection. It touches nothing but stainless steel.

After the fruit is sterilized and scrubbed, stainless knives halve it, stainless burrs ream out the juice, which drains into stainless troughs. Stainless pipes carry the juice down to stainless holding tanks. Then through stainless pasteurizers or stainless concentrators, and finally into stainless storage tanks ready for canning and delivery. An all-stainless process.

Close control of temperatures and pressures retains the volatile oils and natural esters. And stainless steel equipment eliminates the slightest hint of metallic flavor. The result: a uniformly high-quality product that virtually sells itself.

U·S·S Stainless Steel is the ideal metal for food-handling. It provides the one sure way of insuring product quality and at the same time prolonging equipment life. Since it is never attacked by citric, acetic, tartaric, lactic, or other food acids and alkalies, there is no limit to its useful life.

Write today for names of fabricators who can supply you with equipment made of this money-saving metal.



HERE IS A BATTERY of high-speed automatic stainless reaming machines in the new citrus plant of Cal-Juices, Inc., Anaheim, Cal. Through the entire process U·S·S Stainless Steel protects both quality and flavor.

• • •

ORANGEADE CONCENTRATE is mixed in these motor-agitated vats of U·S·S Stainless Steel, which retain the volatile oils and natural esters and prevent contamination of the delicate flavor.

Made in
U·S·S STAINLESS STEEL
the finest thing you can say about any food product

USS

Look for this symbol on steel products. It represents the highest quality, the finest metallurgical service.

STAINLESS STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
NATIONAL TUBE COMPANY, *Pittsburgh*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Products Company, New York, *Export Distributors*
Scully Steel Products Company, Chicago, *Warehouse Distributors*

UNITED STATES STEEL

STAINLESS AND SEAMLESS STEEL TUBING PROVIDES SANITATION AND SAFETY...

MILK — like other liquid food products — must be piped with a maximum of sanitation and safety. Bowman Dairy Co., Chicago, use Globe Stainless Seamless Steel Tubing for this important service.

Where sanitation is mandatory . . . in the vital arteries of food processing . . . Globe Seamless Stainless Tubes are specified for these advantages.

- no seams or welds, no niches, cracks, or crevices to harbor bacteria.
- no dependence on thin coatings; the entire wall thickness is stainless steel. Daily scouring only improves the polish and improves sanitation.
- the normal flow of liquids and cleaning compounds tends to keep seamless tubing naturally flushed.
- it is tubing that is chemically and physically inert to most process products — is not itself affected nor does it affect them.
- no lead is used in cold drawing Globe Stainless Steel Tubes — eliminates lead dangers.

Globe Stainless Seamless Tubes are available in 18-8 and other analyses; a Globe engineer will gladly supply detailed technical information.

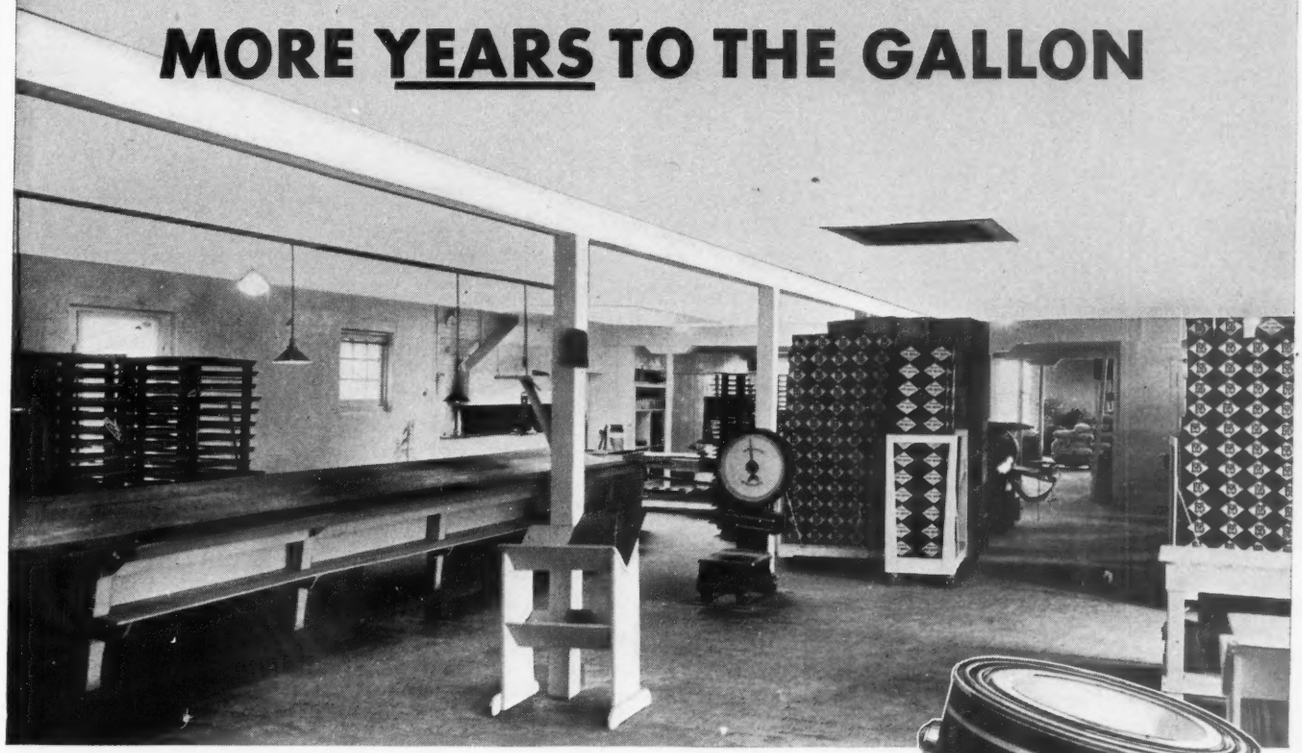
GLOBE STAINLESS TUBE CO. • 4005 W. Burnham St., *Milwaukee, Wis.*

STARTS WHITER • STAYS WHITER • COSTS LESS TO APPLY • COSTS LESS TO MAINTAIN

DULUX *the mill white that gives...*

REG. U. S. PAT. OFF.

MORE YEARS TO THE GALLON



DULUX not only *starts* whiter than ordinary mill whites . . . it stays white *longer*. It requires fewer repaintings.

Titanium—the whitest pigment known to science—gives DULUX its brilliantly white *start* . . . its ability to reflect more light. And the DULUX vehicle gives the amazing *staying* powers to this tough, durable finish.

Highly resistant to chipping and cracking, DULUX is setting new records for whiteness retention. Its tile-smooth surface stays cleaner than ordinary mill whites, too. And it *washes* without harm.

DULUX is economical

Because of its excellent hiding and good coverage, you will often need fewer gallons per job—a saving of both labor and material.

Send the coupon! We'll send full information about DULUX—the mill white that makes your money go further because it gives "more *years* to the gallon."

SEND FOR THIS FREE BOOK!

DU PONT **DULUX**

REG. U. S. PAT. OFF.

THE MILL WHITE THAT STAYS WHITE

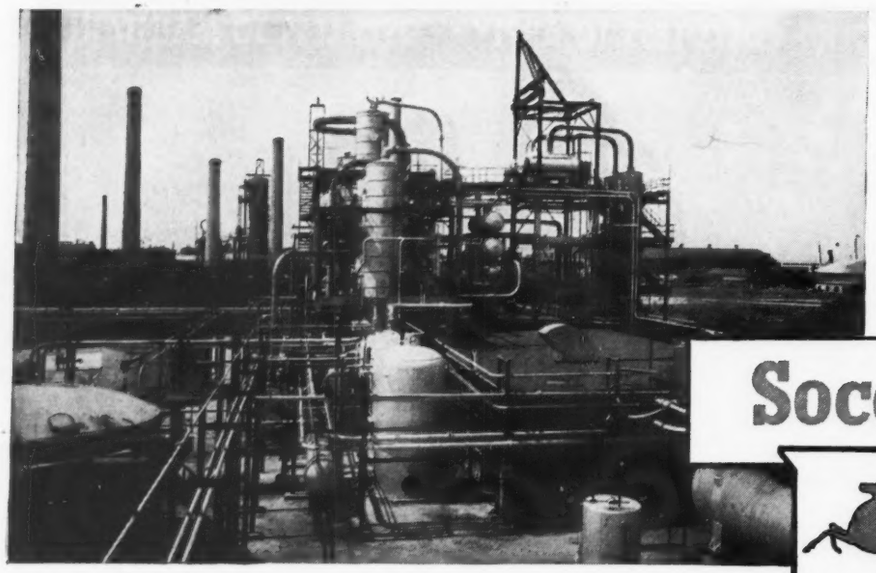
E. I. du Pont de Nemours & Co. (Inc.), Dept. F-129
Finishes Division, Wilmington, Delaware

Please send me complete information about DULUX Mill White—and your new booklet.

Name.....

Address.....

City.....State.....



SOCONY-VACUUM

SOCONY-VACUUM

K & M insulation helps to produce these famous lubricants

For high efficiency insulation of the towers of this dewaxing plant, the Socony-Vacuum Oil Company, Inc., confidently selected K & M "Featherweight" 85% Magnesia, one of the most efficient forms of insulation ever developed for temperatures up to 600° F.

The material was supplied by the Armstrong Cork Company, Keasbey & Mattison Distributor with headquarters in Philadelphia and Baltimore, whose service includes not only the supplying of quality insulation materials, but their correct application in a customer's plant. Armstrong has found that K & M insulation does its full part in building good will and clinching Armstrong's position in this highly technical field.

Keasbey & Mattison engineers, working with K & M Distributors strategically located throughout the country, can point the way to real savings in your plant, too. Why not write Dept. 11 for further details?

K & M

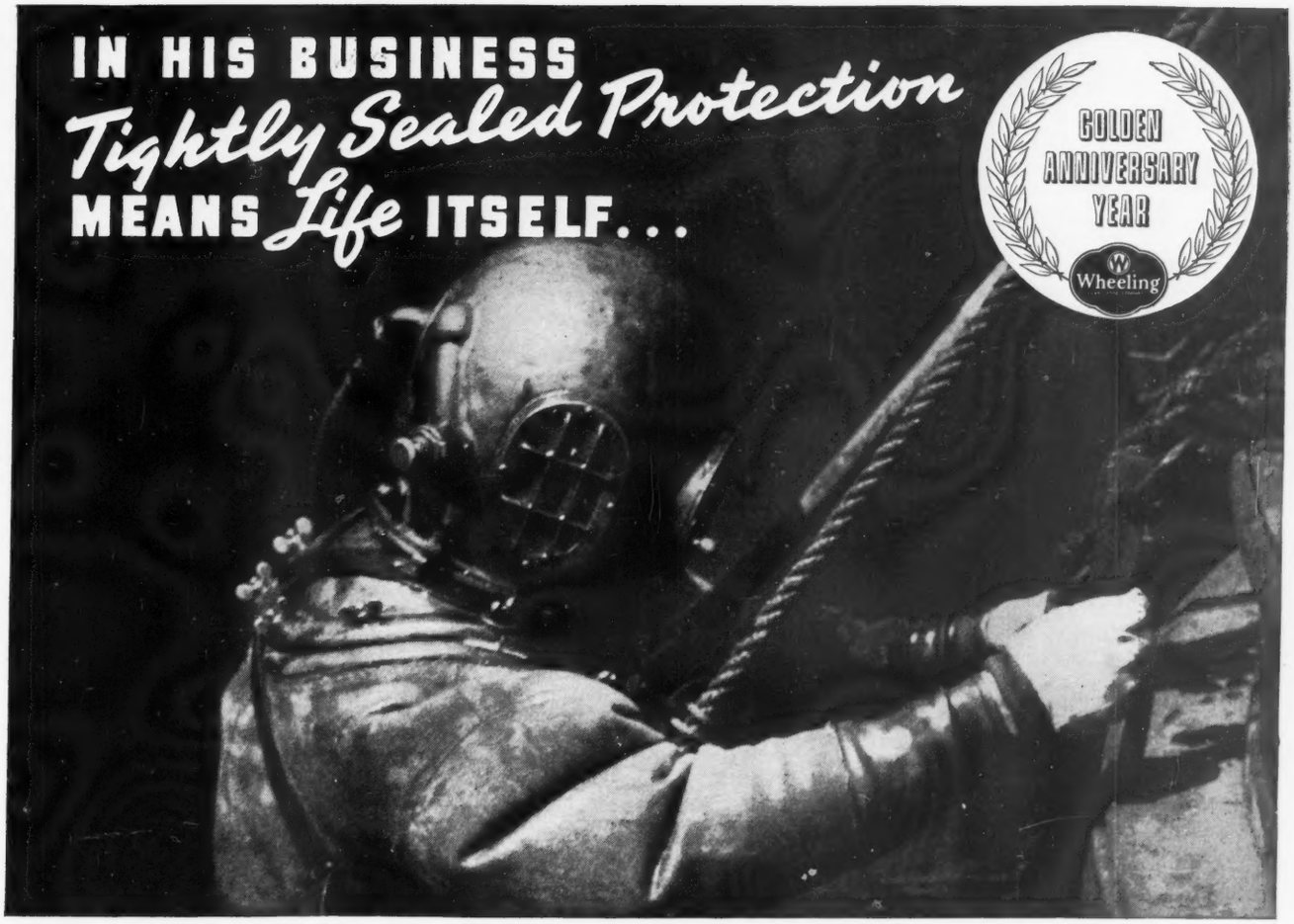
"FEATHERWEIGHT" 85% MAGNESIA

"The Time-Proven Insulation"

KEASBEY & MATTISON

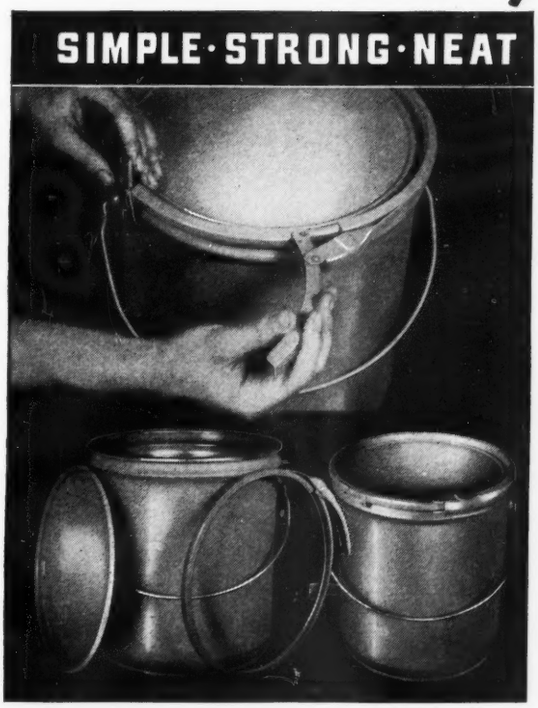
COMPANY, AMBLER, PENNSYLVANIA

Heat is such an important factor in the processing of food products generally that the conservation of heat by means of efficient insulation produces substantial operating economies. Keasbey & Mattison Asbestos and Magnesia products provide exceptional efficiency, durability and physical properties. Behind them is the 65 years' experience of this Company in the development of specialized insulations. The K & M line is complete, and priced right. Distributors' warehouses are strategically located throughout the country for quick service.



Wheeling
CORRUGATING COMPANY

In Your Business
"SEAL-TITE LEVER-RING CLOSURES"
will protect Your Product



EASY ON . . . Easy Off—with absolute air-tight, leak-proof sealing of the contents at all times—these are the advantages which the new Wheeling *SEAL-TITE* LEVER-RING CLOSURE gives to Wheeling Steel Containers. Note the easy operation, and the strength and sturdiness of its simple lever action. Note also the streamlined design that becomes an integral part of the package without detracting from its lithographed decorations; flat top, free from obstruction—permits nesting and the use of covers with pouring equipment. These containers pass all requirements of ICC-6D-80 specification.

There's a Wheeling Container, in 1 to 70-gallon sizes, to exactly suit your packaging needs. Tell us what you pack, and we will gladly submit suggestions.

WHEELING
CORRUGATING COMPANY
***General Offices:* Wheeling, West Virginia**

Food Manufacturers—

Did You Get YOUR Copies of These Valuable Food Industries Reprints?

FOOD TECHNOLOGY

1. Measurement and Control of Flow in Food Processing Operations—No. 13 in Food Industries' Unit operations of Food Engineering series. Sixteen pages giving information on how flow instruments operate, what types are available, what these will and will not do, and what uses food manufacturers are making of them. Illustrated with 24 working diagrams. 10 cents each.

2. Solving Package Wrapping Problems—Another unit operation in food engineering. Tells how to control the movement of filled packages on transfer belts designed to feed wrapping machines. Five pages, illustrated with 4 working diagrams. 10 cents each.

3. Controlling Packaging Supplies—a management function of food engineering. This article tells you how six food companies solve the problem of having on hand the right amounts of the right packaging supplies at the right time. Eight pages, illustrated. 10 cents each.

4. Drying Foods With Non-Rotary Air Dryers—a unit operation of food engineering. This informative, four page article tells you why various types of conveyor, truck and tray dryers are receiving increased attention from food engineers. 10 cents each.

5. Automatic Control of Batch-Process Temperature—a unit operation of food engineering. A simple explanation of the control equipment available and how it should be applied to obtain greater production of better quality products at less cost. Eight pages, illustrated with nine working diagrams. 10 cents each.

6. Equipment for Air Conditioning—an eight page article, illustrated with nine diagrams, which explains in simple language how the available air conditioning equipment is best employed. 10 cents each.

7. Controlling Production and Materials—a management function of food engineering. An eight page article which explains a system for coordinating sales, production and the purchase of materials in such a way that trouble is avoided. 10 cents each.

8. How Food Technologists are Made—a contribution to Food Industries by the Department of Biology and Public Health, Massachusetts Institute of Technology. 10 cents each.

9. Quality Separation by Differences of Density—a unit operation of food engineering—by the editor of Food Industries, Dr. L. V. Burton. This is a specially bound, 15-page article of interest to all food manufacturers. Contains 16 charts, diagrams and photographs. 35 cents each.

10. Automatic Control of Temperature in Continuous Processes; (11) Magazine Feeds Solve Some Package Wrapping Problems; (12) Materials Handling; (13) Evaporation; (14) Mixing (in 2 parts); (15) Centrifugal Separation; (16) Automatic Control of Pressure—all unit operations of food engineering. These articles have appeared as a series in Food Industries and are offered separately or as a group. Each reprint is complete in itself and adequately illustrated with workable diagrams. All 10 cents each (entire set of 16 Reprints—$1.50).

QUALITY STANDARDS FOR FOODS

17. Minimum Quality Standard for Canned Tomatoes as issued by the U. S. Dept. of Agriculture, Food and Drug Administration—with authentic color swatch. Price to subscribers, 35 cents each—to non-subscribers, 50 cents each.

18. Tentative United States Standards for Grades of Frozen Lima Beans as issued by the U. S. Dept. of Agriculture, Agricultural Marketing Service—with authentic color swatch. Price to subscribers, 50 cents each—to non-subscribers, 75 cents each.

19. Tentative United States Standards for Grades of Frozen Peas as issued by the U. S. Dept. of Agriculture, Agricultural Marketing Service—with authentic color swatch. Price to subscribers, 50 cents each—to non-subscribers, 75 cents each.

PUBLIC RELATIONS

20. Public Relations for Industry—a presentation of the imperative need of mutual understanding in the conduct of our daily work . . . with special reference to the food industries. 25 cents each.

21. These "Chinese Walls" Will Choke Your Business—the interstate trade barriers which are splitting the U. S. into 48 dis-united, isolationist fragments. A Public Relations special feature. 25 cents each.

FROZEN FOODS

22. 1939 Edition Frozen Foods Directory. Lists companies engaged in packing frozen food, together with the location of their plants, brand names, products packed, containers and systems used, and output. 35 cents each.

23. Packaging for Frozen Foods—Packaging Machinery, Containers & Supplies—Mistakes to Avoid in Packaging—a 48-page booklet, attractively bound in 2-color paper covers, and originally published as a special supplement to the March, 1939 issue of Food Industries. Contains information of lasting value. 35 cents each.

FOR QUICK RESULTS—MAIL COUPON TODAY

FOOD INDUSTRIES, 330 W. 42nd St., N. Y.

I have circled below the reprints I want and enclose check ( ) cash ( ) covering cost. Please mail at once.

1 2 3 4 5 6 7 8 9 10 11 12 13
14 15 16 17 18 19 20 21 22 23

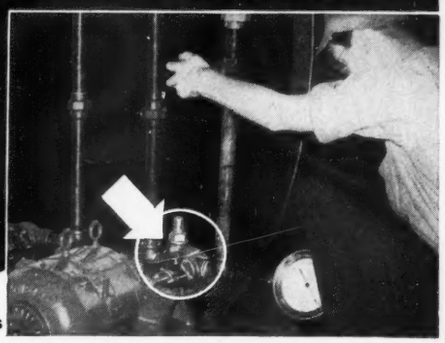
My Name..... *Title*.....

Company .....

Street .....

City and State.....

the Equivalent of Over 60,000 Miles on Your Automobile— and NO CAPACITY LOSS!



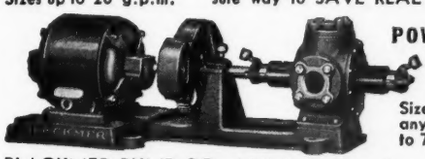
15 Models

HAND PUMPS

for pumping from drums, barrels, etc. Easy to turn—fast acting—self-priming.
Sizes up to 20 g.p.m.

BLACKMER Rotary Pumps are trouble-free. We know that, because of the exacting tests we give them. Recently we ran a standard pump 2500 hours continuously at 1800 r.p.m.—equal in performance to over 60,000 miles on your automobile. Then, by actual measurement, we found NO CAPACITY LOSS.

Let us in on your next pumping problem. That's a sure way to SAVE REAL MONEY in overall cost!



POWER DRIVEN PUMPS

Ideal for pumping almost any liquid—acids, alkalies, chemicals, oils, foods, etc. Sizes from 20 to 700 g.p.m.—any type of drive. Pressures up to 75 pounds.

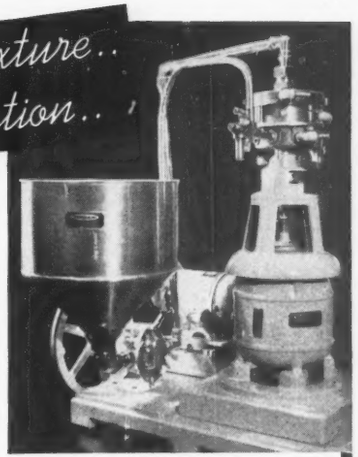
BLACKMER PUMP CO., 1866-8 Century Ave., Grand Rapids, Mich.

BLACKMER ROTARY PUMPS
AUTOMATIC TAKE-UP FOR WEAR
EXCLUSIVE BUCKET DESIGN

Smoother texture.. No Separation..

with the

Eppenbach COLLOID MILL



- **Never exposes the product to the atmosphere**

The Eppenbach Mayonnaise Mill is a completely closed unit, handling the product from pump to mill without exposing it to the air. Easy to clean. Contact metals made of stainless steel. Sizes to handle from 1 to 10 gallons a minute. Will handle mayonnaise, salad dressings, French dressings and materials of similar character. An outside micrometer adjustment can be set while mill is in operation. Makers of baby foods, condensed soups, shortenings and any product where smooth texture and no separation are important will be interested in the Eppenbach COLLOID MILL. Write for Catalog. Better still—

→ *Meet us at Booth 318 at the Chemical Show*

EPPENBACH, Inc.
45-10 Vernon Blvd.
Long Island City New York

Careycel ASBESTOS INSULATION

PIPE COVERINGS and BLOCKS

The Carey patented process of "Cellizing" the asbestos sheets makes possible the high efficiency of Careycel.

CAREYCEL—the patented, INDENTED (not corrugated) Asbestos Insulation—is designed specially to insulate pipes, domestic and industrial boilers, water heaters, ovens and other apparatus carrying temperatures up to 300°F.

CUTS HEAT LOSSES 30%

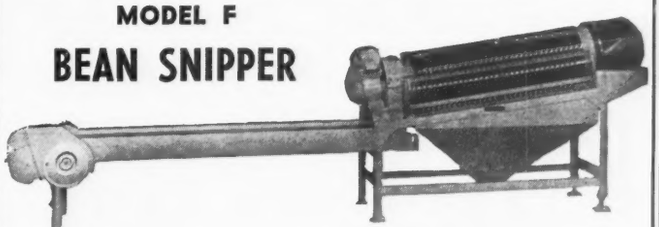
Heat loss through Careycel, according to impartial Mellon Institute tests, is 30% less than through an equal thickness of aircell (coarse corrugated) asbestos insulation. Shrinkage is negligible—only 0.05%. Provides smoother outer surface. Careycel may be obtained in the form of pipe covering; sheets and blocks, either flat or curved to any desired radius.
For complete data on this ultra-modern insulation, write Dept. 32.

THE PHILIP CAREY COMPANY • Lockland, Cincinnati, Ohio
Dependable Products Since 1873
BRANCHES IN PRINCIPAL CITIES

Doubles Capacity... Cuts Operating Cost

MODEL F

BEAN SNIPPER



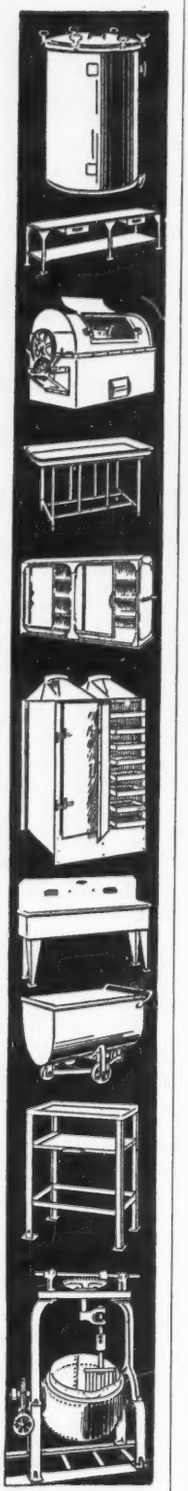
Entirely new in design—entirely different in principle—the CRCO Model F Bean Snipper is already revolutionizing former ideas of efficiency and volume. The Model F is proclaimed by bean packers to be as far advanced over other types now in general use as the original CRCO Bean Snippers were over hand snipping.

Write for special Model F Bulletin No. 6 and learn how you can increase your production from 100 to 400% without increasing labor costs.

Chisholm-Ryder Co.

Niagara Falls, N. Y. Chicago, Ill. Seattle, Wash.
Columbus, Wis. Jas. Q. Leavitt & Co., Ogden, Utah
A. K. Robins & Co., Baltimore, Md.
146 W. D. Chisholm, Niagara Falls, Canada

IT'S NOT AN ORDINARY PIECE OF EQUIPMENT THAT WE NEED HERE.
NO...THAT EQUIPMENT MUST BE MADE TO FIT OUR INDIVIDUAL MANUFACTURING NEEDS.



Koven Can Design and Build Food Equipment that WILL Meet Your Individual Production Requirements

Every manufacturer knows how profitable it is to have equipment that is designed and built to suit his individual needs. This is why so many of America's leading food manufacturers depend upon KOVEN when they require special equipment . . . they know that for over 50 years KOVEN has given the food industry much of its finest equipment . . . KOVEN-IZED equipment . . . equipment fabricated by experts in all the leading commercial and non-corrosive metals.

A consultation with one of our widely experienced engineers obligates you in no way but it will demonstrate how easily you too can get the special equipment you need.

Phone or write for a KOVEN representative today!

Among the many KOVEN products:

Stainless steel
Aluminum Sheet Fabrication
Boxes, Tote, Waste Cans
Chemical Apparatus
Coils and Pipe Bands
Copper Sheet Fabrication
Galvanizing Work
Kettles, All types, All Metals
Mixers, All Kinds
Monel Metal Fabricator
Pails, Special Heavy
Pans, All Types, All Metals
Sinks, Scullery and Factory
Tables, Galvanized or Monel
Tanks, All Types, All Metals

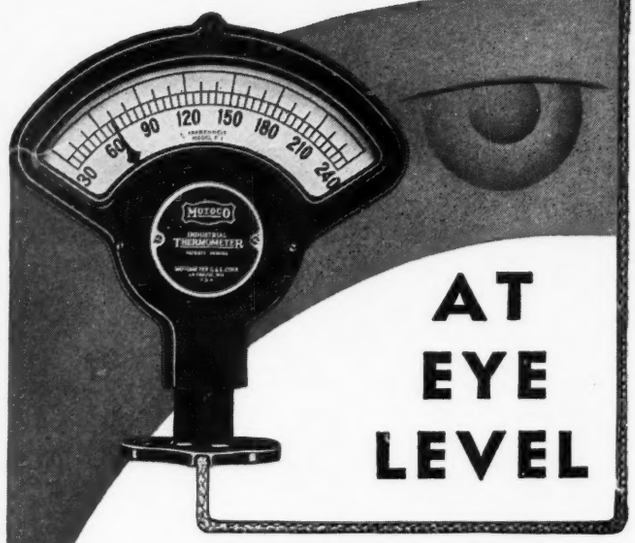
WATERFILM Industrial Heating Boilers

Be sure to see our exhibition in Booth 249 at the 17th Exposition of Chemical Industries at Grand Central Palace, December 4 to 9, 1939.

KOVEN New Jersey Plant

L. O. KOVEN & BRO. INC.
154 Ogden Ave.
JERSEY CITY, N. J.

REMOTE TEMPERATURE READINGS



AT EYE LEVEL

Motoco
F-1
Dial
Thermometer
$20 LIST PRICE

Moto Meter pioneered in developing the dial-type thermometer. This modern instrument, as perfected in MOTOCO models, insures quick, accurate readings in most accessible locations. With MOTOCO temperature indication, protection is obtained from spoilage, quality of food products is maintained or improved. Faster, more efficient production frequently results.

MOTOCO thermometers are made with solid liquid filled movement. They are sturdily constructed without gears, pinions or delicate hair springs to get out of order. Rigid stem for direct mounting or capillary tubing for remote reading.

Install MOTOCO dial-type thermometers wherever temperature is an important factor. They are priced so low that installation can be made at every point where temperature indication is desired.

Your inquiry today will bring information on how MOTOCO temperature indication can serve you most profitably. Write to Moto Meter Gauge & Equipment Division, The Electric Auto-Lite Company, Chrysler Bldg., New York, N. Y.

MOTOCO
INDUSTRIAL THERMOMETERS

THERE'S SOUND ENGINEERING IN EVERY DETAIL OF STANDARD CONVEYORS

2½" DIA. 14 GA. ROLLER
SOLID HARDENED RACES
12—⅜" CHROME STEEL BALLS
HARDENED INNER RACE
HOG RING OR COTTER KEY
7/16" HEXAGON SHAFT
ANGLE OR CHANNEL FRAME
CAPACITY PER ROLLER IN LEVEL LINES 175 LBS. IN SLOPED LINES 125 LBS.

STANDARD Conveyor engineers, with more than thirty years of experience and special knowledge to draw upon, place a great deal of emphasis on the proper type of bearing for roller conveyor service.

All bearings used in Standard Roller Conveyors are built by Standard to the highest possible standards—sturdy, compact, and of a design which retains its sensitiveness and life during years of operation under the most adverse conditions.

Bearings are just one of the many details typical of the sound engineering and construction of Standard Conveyors.

Call a Standard Engineer on your next conveyor requirement and send for bulletin "Conveyors by Standard" FI-12—a valuable reference book on conveying methods.

Standard "THE STANDARD OF VALUE"
CONVEYORS
STANDARD CONVEYOR COMPANY—NORTH ST. PAUL, MINN.

Send for bulletin "Conveyors by Standard" FI-12 — a valuable reference book on Conveying methods.

THIS IS THE PICTURE THAT IS WORTH A THOUSAND WORDS

ABC

to BUYERS OF ADVERTISING SPACE

IF you buy advertising space today, you have one tremendous advantage over advertisers of twenty-five years ago.

Before 1914, men would have given an eye-tooth for the vital information on circulation which you can have for the asking — in A.B.C. reports. These reports give complete, authoritative facts to guide your buying and to make your advertising more effective.

A.B.C. reports reveal and analyze NET PAID CIRCULATION—the true measure of advertising value. A.B.C. reports answer these three vital questions about circulation: how much is there? where is it? how was it obtained? The answers give verified information on *quantity*, and an important index on *quality* of circulation.

Don't fail to make use of this great advantage. Before you buy space in this or any other publication, get the A.B.C. report. Study it. Determine how the circulation meets your requirements. Then buy with the knowledge that you are buying wisely and effectively.

Our circulation is fully audited in our latest A.B.C. report. We are proud of this report and will be glad to give you a copy

ABC **FOOD INDUSTRIES** ABP

A.B.C. = Audit Bureau of Circulations = FACTS as a yardstick of advertising value

"YOU don't seem to realize," said the president steadily, "that with material and labor costs—and taxes—so greatly increased, we can't spend . . ."

"Unless we do spend," the production executive interrupted, "to modernize and cut operating cost, you'd better order another carload of red ink."

"Just what do you suggest?"

"I suggest that we get a man in here to make a free survey of our plant and show us exactly where and how we can cut our operating costs and reduce waste."

The free survey was made. As a result of it, Taylor Automatic Controls were installed throughout the plant. Shortly the company was in the black . . . operating costs had been reduced by more than one-third.

* * *

THIS STORY is typical of the way Taylor is helping industry to overcome the problems of today—the problems of higher taxes, of increased material and labor costs. For Taylor shows you how to attack the one cost which you can reduce—operating cost.

Taylor Automatic Controls can insure the uniformity of your product... can reduce spoilage and speed production. This means more sales and greater profits for you.

Write today for a Taylor man to make a free survey of your plant. No obligation, of course. Taylor Instrument Companies, Rochester, N. Y. Plant also in Toronto, Canada. Manufacturers in Great Britain: Short & Mason, Ltd., London, England.

Taylor

Indicating | Recording • Controlling

TEMPERATURE, PRESSURE, FLOW
and **LEVEL INSTRUMENTS**

SEARCHLIGHT SECTION

EMPLOYMENT : BUSINESS : OPPORTUNITIES : EQUIPMENT—USED or RESALE

UNDISPLAYED—RATE PER WORD:

10 cents a word, minimum charge $2.00.

Positions Wanted (full or part-time salaried employment only), ½ the above rates, minimum $1.00 an insertion, payable in advance.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads. Replies forwarded without extra charge.

Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH

The advertising rate is $5.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on one column, 3 columns—30 inches—to a page. Food Industries

Copy for new advertisements must be received December 20th for the January issue

POSITIONS WANTED

CHEMIST FOOD AND PHARMACEUTICAL—excellent scholarship record. Fordham graduate; desires apprenticeship. PW-428, Food Industries, 330 W. 42nd St., New York, N. Y.

CHEMIST-TECHNOLOGIST, graduate. Experienced syrups, wines, beverages, plant control, development. PW-429, Food Industries, 330 W. 42nd St., New York, N. Y.

EXPERIENCED IN MANUFACTURE and control of Animal Food, Soups, Beans with Pork, Potato Sticks, Tomato and other fruit and vegetable products. Technical Training. Address PW-430, Food Industries, 330 W. 42nd St., New York, N. Y.

SELLING OPPORTUNITIES
OFFERED—WANTED
Selling Agencies—Sales Executives
Salesmen—Additional Lines

OPPORTUNITY OFFERED

ATTENTION: State Salesmen and Jobber distributors. We desire State Salesmen to represent us selling Vita-Hi Food Products to Jobber distributors. We also desire to hear directly from Jobber distributors who are interested in marketing these fine foods. Raymond Products Co., 159 N. Main, Marion, Ohio.

WANTED

Used filter press guaranteed good condition. Prefer bronze warranted for washing. State price, make and size with particulars in replying. W-427, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

THERMOMETERS
Recording—Indicating—Controlling
REPAIRED—REMODELED
All Work Guaranteed—One Year
For Highest Quality Service
Call or Write
PENN INSTRUMENT CO.
1053 E. 76 St., Chicago Tel. Stewart 2388

FOR SALE
COMPLETE
New Mustard Plant
FS-426, Food Industries
520 No. Michigan Ave., Chicago, Ill.

WANTED

WANTED FOR USER
Stainless Steel, Monel, Copper or Aluminum Jacketed Kettle and Vacuum Pan; 2—Dry Powder Mixers, with or without Sifters; 2—Rotex Screens; 1—Packaging Machine; 2—Tablet Machines; 3—Filters; 1—Glass Lined Kettle.
W-421, Food Industries
330 W. 42nd St., New York City

STEAM JACKET, COPPER KETTLES
New and good Rebuilt guaranteed
15 to 500 gallon capacity, with and without agitators; guaranteed steam pressure
Hamilton Copper & Brass Works
Hamilton, Ohio
Responsible Coppersmiths Since 1871

NEW AND USED
Steam Jacket, Copper Kettles
20 to 300 gal. capacity.
THOS. BURKHARD, INC.
494-496 Flushing Ave., Brooklyn, N. Y.
Coppersmiths Since 1836

TO HELP YOU
SELL WHAT YOU NO LONGER NEED
"Searchlight" Advertising

FOOD INDUSTRIES . . . renders an exclusive and invaluable service to Food Manufacturers by giving them each month—**IN ONE PUBLICATION**—all the significant developments in every branch of the Food Field.

Guaranteed Rebuilt Equipment

Packaging Units:
2—PNEUMATIC SCALE Packaging Units.
2—PNEUMATIC SCALE late type WAX LINERS.
1—BRIGHTWOOD Automatic BOX MACHINE.
1—STOKES & SMITH Tight Wrapper.
Equipment still set up as was operated.

Mixers and Sifters:
5—Cake & Mayonnaise Mixers.
Dry Powder Mixers, with and without sifters, laboratory size to 4000 lbs. capacity.

Labelers:
2—WORLD Rotary Automatic Labelers.
5—Semi-Auto. WORLD, ERMOLD & NATIONAL.
5—BURT & KNAPP Can Labelers.

Presses:
3—SHRIVER 30" recessed Cast Iron Filter Presses; many other sizes.
500-ton Hydraulic Crackling Press.
1—U. S. BOTTLERS 5-12" bronze plate filter, complete with motor and pump.

Fillers:
3—KARL KIEFER Rotary & Piston, Visco Fillers.

Cappers:
1—PNEUMATIC SCALE Auto. Screw Capper.
1—ELGIN single Screw Capper.

Kettles and Tanks:
1—PFAUDLER 2600 gal. glass-lined Tank.
1—Alum. Hoz. Storage Tank, 1100 gal.
5—B & S jacketed Kettles 10'x3', 6'x2'.
ALUMINUM Steam Jack. Kettles, 10 to 175 gal.
COPPER Steam Jacketed Kettles, 5 to 500 gal.
8—GLASS-LINED Jacketed Kettles: 1—100 gal. agitated; 2—200 gal.; 3—350 gal.

Miscellaneous:
4—ALLBRIGHT-NELL Lard Cooling Rolls 4'x9'.
6—COPPER Vacuum Pans, Jacketed, 40, 50, 75, 350 and 500 gal.
1—ARCTIC 4x4 Ammonia Compressor, complete.
1—YORK 6x6 Ice Machine.
2—SPRAGUE Sells Retorts, 40"x72" complete.
1—LEWIS SUGAR DRYER 32"x11' long.
1—#3 SCHUTZ O'NEILL Sugar Pulverizer.

Visit us—Suite 1402-4, Hotel Lexington, New York City during Chemical Show—Week of December 4 to 9.

We buy and sell from a Single Item to a Complete Plant

CONSOLIDATED PRODUCTS CO., Inc.

Office: 13-17 PARK ROW, N. Y. • Shops: 335 DOREMUS AVE., NEWARK

Buy With Confidence — "Consolidated"

BEFORE INVENTORY TIME . . .

Now is the time to clear out all idle equipment, obsolete and poor production units. Highest cash prices now paid for your surplus machinery. It's a good time too, to replace them with GUARANTEED FMC RE-NEWED EQUIPMENT. You'll find just what you need in our big stock. Immediate delivery . . . and SAVINGS up to half without any sacrifice in efficiency.

OUTSTANDING OFFERINGS from 1939 LIQUIDATIONS

1000 KETTLES—All Metals—All Sizes
2—350 gallon Burkhardt steam jacketed kettles.

CONVEYORS
1000' all-ball-bearing roller conveyor, assorted sizes.

CAPPERS
1—Pneumatic Scale 6-head automatic screw capper.
3—Burt Can Labelers.
1—World automatic rotary labeler.
2—McDonald straight lined automatic labeling machines.
1—20th Century rotary Pulper.
2—Copper Digesters, dimensions 42"x96" I.D.

FILLING MACHINES
3—Progressive (Eclipse) 6-piston all monel metal fillers.
3—Filler Machine Company 4-piston fillers.
1—Kiefer Visco rotary gear type, #3.

RETORTS
5—Zastrow and Sprague-Sells 40"x72" & 40"x60" vertical retorts.
5—Allbright-Nell Horizontal Cylinder Retorts 54"x12'; complete with 3 trucks for each; 15 extra trucks available.

SIFTERS AND MIXERS
J. H. Day 100 lb. to 600 lb. capacity.
Gedge-Gray 3000 lb. capacity.
Robinson Unique Tumbling Barrel Mixer; 4'x6' I.D.; 75 cu. ft. cap.; on stand.

MISCELLANEOUS
Filter presses, vacuum and atmospheric dryers, glass lined tanks, agitators, food and vanilla bean choppers, case sealing machines, bucket elevators, peanut roasting equipment, storage tanks, etc.
STANDARD-KNAPP #429 GLUER & SEALER.

FIRST MACHINERY CORPORATION

•GUARANTEED EQUIPMENT

F M C

LIQUIDATORS APPRAISERS

EAST 9th STREET and EAST RIVER DRIVE

GRamercy 7-6622 Cable: "EFFEMCY"

NEW YORK, N.Y.

Send for Complete Illustrated Folder

FOR GREATER SAVINGS UNION

Rebuilt Machinery

Modern Guaranteed Rebuilt Machinery

Stokes & Smith, 2 spout Gross and Net Powder Filler. Will fill from ½ to 2 lb. cans, 60 per minute on the 2 lb. size.
Colton No. 3 Tablet Machines.
Dopp, 4 ft. Iron Vacuum Pan, complete with pump.
Buflovac Iron Vacuum Crystalizer, 6' diameter, jacketed, motor driven complete with Pump Equipment.
Lehman model 213—W High Speed 3 Roller Mill.
Knapp Can Labelers.
Eppenbach # 2 Colloidal Mill.
Copper Vacuum Pans, 30 to 300 gal. cap.
Copper Kettles, steam jacketed, 10 to 500 gal. cap., with and without agitators, all types.
Copper Coating Pans, all sizes, with and without steam coils.
Glascote, 330 gal. cap., glass lined, jacketed Tanks, with motor driven agitator.
Bottle Sterilizers, Ft. Wayne, Rotary.
Bottle Fillers, Standard 6 spout, Automatic Vacuum type.
Bottle Labelers, World and National
Vertical Mixers, Read, Hobart, Century Champion, Glenn and Day all sizes, from 10 to 150 qt.
Mixing Machines, dough type, single and double arm, 1 to 10 barrel.
Filters, Pulverizers, Fillers, Dryers, etc.

SEND FOR LATEST CATALOG

Write or Wire Collect for Prices and Information

UNION STANDARD EQUIPMENT CO.

320-322 LAFAYETTE ST., N. Y.

We Pay Cash for Single Machines or Entire Plants

FOR SALE

3—30" Cast Iron Filter Presses.
1—8x10' Oliver all-iron Filter.
4—Sweetland Filters—#1 and #5.
5—Copper Vacuum Pans 3 to 6'.
1—4x9' Allbright-Nell Lard Roll.
2—6'x26' Louisville steam tube Dryers.
4—Conveyor Tables 12' to 16' long.
3—#10 and #20 Day Imperial Mixers.
50—Copper Steam Jacketed Kettles.
2—Rotary Bottle Rinsing Machines.
3—Filler Machine Co. Filling Machines.
5—Bottle and Can Labeling Machines.
10—Hobart, Read, Triumph Mixers. Dough and Powder Mixers, Bottle and Can Fillers, Filters, Filter Presses, Mills, Dryers, Pumps, Boilers.

Send us your inquiries, also your list of surplus equipment, which we purchase for cash.

LOEB EQUIPMENT SUPPLY CO.
908 N. Marshfield Ave., Chicago, Ill.

FOR SALE

Read 80 quart **Mixer,** type X.H.D.
Hobart 80 Qt. **Beater,** Model M-180
Triangle Bag Filler, type SK
Schultz O'Neill Dustless Sugar Pulverizers, No. 0 and No. 2
350 gallon **Jacketed Glass Lined Tank**
150 gallon **Jacketed Glass Lined Tank** with motor driven agitator
50 gallon **Aluminum Jacketed Kettle**
10 gallon to 450 gallon **Copper Jacketed Kettles**
1 ton York, 3 ton **Frick Self Contained Ammonia Ice Machines**
5 ton **Baker,** 5 ton **Frick,** 3 ton **York Ammonia Compressors**

SAVAGE BROS. CO.
2632-46 Gladys Ave., Chicago, Ill.

SPECIAL OFFERINGS

1—#7 Sweetland Filter.
4—Alsop Disc Filters; 12" to 16" diameter, 10 to 40 discs.
10—Shriver Filter Presses; 12" to 36". Wood, Aluminum, Iron, or Bronze.
2—Kiefer Automatic Visco Fillers.
10—Bottle and Can Labelers.
20—Kettles: Copper and Aluminum, 10 to 250 gallons.
10—Bronze Pumps ¾" to 2".
5—Powder Mixers 100# to 3,000#.

Also a complete stock of **Mixers, Tanks, Pulverizers, Filters, Conveyors.**

Send For Our Latest Catalog!

BRILL EQUIPMENT CORPORATION
183 Varick St., N.Y.C.

FOR SALE

4—2170 gal. Glascote Glass lined Tanks.
Atmospheric Double Drum Milk Dryers 28"x72" to 36"x100".
4 ft. x 9 ft. Devine Atmospheric Drum Dryer.
10 H.P. Schwab Tubeless Boiler.
50 gal. Pfaudler Glass Lined Emulsifier.
620 and 2000 gal. Stainless Steel Truck Tanks.
200, 300 and 500 gal. Pfaudler Tanks, jkt., agit.
12" Sperry Stainless Steel Filter Press.
12" Shriver Filter Press, 12 recessed plates.
50 to 800 gal. Homogenizers or Viscolizers.
100 gal. Copper Jacketed Kettle with agitator.
500 gal. Copper Jacketed Kettle, 60"x60".
6x5 Ingersoll-Rand Air Compressor.
3' Badger Copper Vacuum Pan, agit.
3 ft. to 7 ft. diameter Copper Vacuum Pans.

Large Stock of Refrigerating Machinery, also Milk and Ice Cream Plant Equipment.

Send Us Your Inquiries.

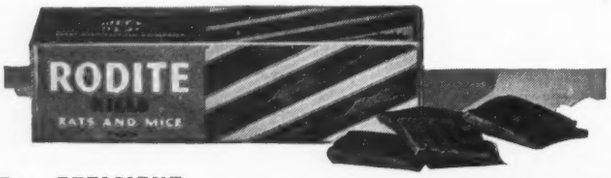
ROBERT P. KEHOE MACHINERY COMPANY
1 East 42nd Street, New York, N. Y.

KILLS RATS AND MICE THIS NEW *EASY* WAY...

RODITE is an especially prepared cereal cracker containing (1) a lure for rodents and (2) a special highly concentrated extract of red squill.

Red squill is a plant, the bulb of which contains a substance which is poisonous to rodents but has been described by the United States Department of Agriculture as relatively harmless to human beings and domestic animals. It is, therefore, much to be preferred to dangerously poisonous materials.

RODITE is a ready-prepared product. There is nothing to mix; nothing else to buy. The product is dry, clean and, if not entirely consumed, leaves only dry fragments for the sweeper.

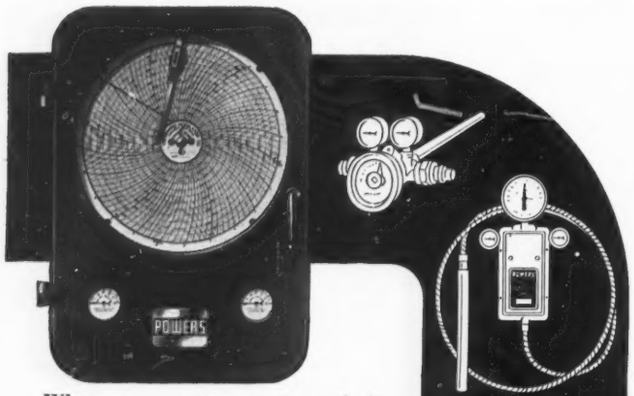


For EFFICIENT CLEAN EXTERMINATION investigate RODITE, a dry-form, ready-to-use bait. Write for circular.

RODITE

WEST DISINFECTING COMPANY

Dept. F, 42-16 West St., Long Island City, N.Y.



When you want accurate and dependable automatic temperature or humidity control for Air Conditioning systems or Industrial Processes call in a Powers engineer. With a very complete line of self-operating and compressed air operated controls we are well equipped to fill your requirements.

THE POWERS REGULATOR CO., 2755 Greenview Ave., CHICAGO.
Offices in 47 Cities—See your phone directory.

48 Years of Temperature and ★ Humidity Control ★

POWERS

★ TEMPERATURE AND HUMIDITY CONTROL ★

Advertisers

	PAGE
Acme Steel Co.	40
Aluminum Cooking Utensil Co.	50
American Can Co.	28
American Gas Association	52
American Steel & Wire Co.	63
Arabol Mfg. Co.	40
*Armstrong Cork Co.	22, 38
Bausch & Lomb Optical Co.	41
Bemis Bro. Bag Co.	(Edit. 727)
*Blackmer Pump Co.	69
*Brown Instrument Co.	32-33
*Buffalo Forge Co.	57
Callahan & Co., A. P.	48
Carey Co., Philip	69
Carnegie-Illinois Steel Corp.	63
Carrier Corp.	70
*Cash Co., A. W.	30
Caterpillar Tractor Co.	9
Century Electric Co.	46
Chain Belt Co.	35
Chesapeake & Ohio Lines	11
*Chisholm-Ryder Co., Inc.	69
Conewango Refining Co.	(Edit. 726)
Container Corp. of America	44
Continental Can Co.	43
Crane Co.	Back Cover
*Cuno Engineering Corp.	15
Curtis Refrigerating Co.	58
Dexter Folder Co.	56
*Dicalite Co.	53
Douthitt Corp.	(Edit. 702C)
*du Pont de Nemours & Co., E. I. (Finishes Div.)	65
Economy Equipment Co.	77
Electric Auto-Lite Co., Moto Meter Gauge & Equipment Div.	70
Eppenbach, Inc.	69
*Fairbanks, Morse & Co.	78
Flexible Steel Lacing Co.	49
Food Industries Catalogs & Directory	16
*Fritzsche Bros.	48
Gaylord Container Corp.	23
General Biochemicals, Inc.	48
General Electric Co.	24-25, 36
General Motors Truck Co.	54
Glass Container Ass'n	34
*Globe Stainless Tube Co.	64
Graver Tank & Mfg. Co., Inc.	14
Gulf Refining Co.	42
Hamilton Kettle Works Co.	41
Hammond Drierite Co., W. A.	(Edit. 702B)
Heekin Can Co.	Third Cover
Hinde & Dauch Paper Co.	59
Hoffman-La Roche, Inc.	31
Howes Co., Inc., S.	49
*Ingersoll-Rand	60
Ingersoll Steel & Disc. Div., Borg-Warner Corp.	12-13
*International Nickel Co., Inc.	37
International Salt Co., Inc.	20-21
*Keasbey & Mattison Co.	66
Kemp Mfg. Co., C. M.	(Edit. 725)
Kiefer Machine Co., Karl	57
*Koven & Bro., Inc., L. O.	70
La Porte Mat & Mfg. Co.	49
Link-Belt Co.	(Edit. 702D)
Lunkenheimer Co.	47
Master Electric Co.	19
*Mathieson Alkali Works, Inc.	(Edit. 729)
McGraw-Hill Book Co.	44, 58
*Merck & Co., Inc.	10
*Mixing Equipment Co., Inc.	(Edit. 732)
*Nash Engineering Co.	29
National Cold Storage Co., Inc.	48
National Tube Co.	63
*Oakite Products, Inc.	(Edit. 731)
Owens-Illinois Glass Co.	55

In This Issue

	PAGE
*Package Machinery Co.	(Edit. 723)
Patterson Fdry. & Machine Co.	58
*Pfaudler Co.	39
Pfizer & Co., Inc., Chas.	49
Philadelphia Quartz Co.	45
Pneumatic Scale Corp., Ltd.	Second Cover
Powell Co., Wm.	51
Powers Regulator Co.	76
*Proctor & Schwartz, Inc.	(Edit. 702B)
Professional Services	58
Quaker City Cold Storage Co.	48
Raymond Pulverizer Div., Combustion Engineering Co., Inc.	(Edit. 702A)
Republic Steel Corp.	6-7
Ryerson & Son, Inc., J. T.	77
Searchlight Section	74-75
*Shriver & Co., T.	8
Standard Conveyor Co.	71
Stange Co., Wm. J.	48
Stein, Hall & Co., Inc.	48
Sterling Pump Corp.	(Edit. 730)
*Taylor Instrument Cos.	73
Terminal Storage Co.	48
Texas Co.	5
U. S. Steel Corp.	63
Viking Pump Co.	45
Vitamin Technologists, Inc.	48
West Disinfecting Co.	58, 76
*Westinghouse Elec. & Mfg. Co.	17-18
Wheeling Corrugating Co.	67
Where to Buy	48
Yale & Towne Mfg. Co.	(Edit. 724)

*** For further detailed information regarding this company's products see the 1939-1940 FOOD INDUSTRIES CATALOGS & DIRECTORY**

SERVICES—PAGE 58

SEARCHLIGHT SECTION

(Classified Advertising)

BUSINESS OPPORTUNITIES	74
EMPLOYMENT	74
PLANT FOR SALE	74
REPAIRING	74
WANTED TO PURCHASE	74
USED EQUIPMENT	74-75
Burkhard, Inc., Thos.	74
Consolidated Products Co., Inc.	75
First Machinery Corp.	75
Kehoe Machinery Corp.	75
Hamilton Copper & Brass Works	74
Brill Equipment Corp.	75
Loeb Equipment Supply Co.	75
Savage Bros.	75
Union Standard Equipment Co.	75

RYERSON CERTIFIED STEELS

Large Stocks... Uniform High Quality... Immediate Shipment... Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structurals, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes and Fittings, Mechanical Tubing, Rivets, Bolts, Nuts, Washers, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

THE ECONOMY "BELTURN"

CONVEYORS THAT TURN CORNERS and SAVE SPACE

Our neat new Economy "Belturn" Conveyors, used successfully by many well-known food plants, will turn corners easily—continuously—safely, and protect your product in transit. They better utilize your factory space and cut the cost of revising the production line—moving machines—even extra building.

Economy Conveyors can be built to any width and length desired, with turns to fit factory conditions.

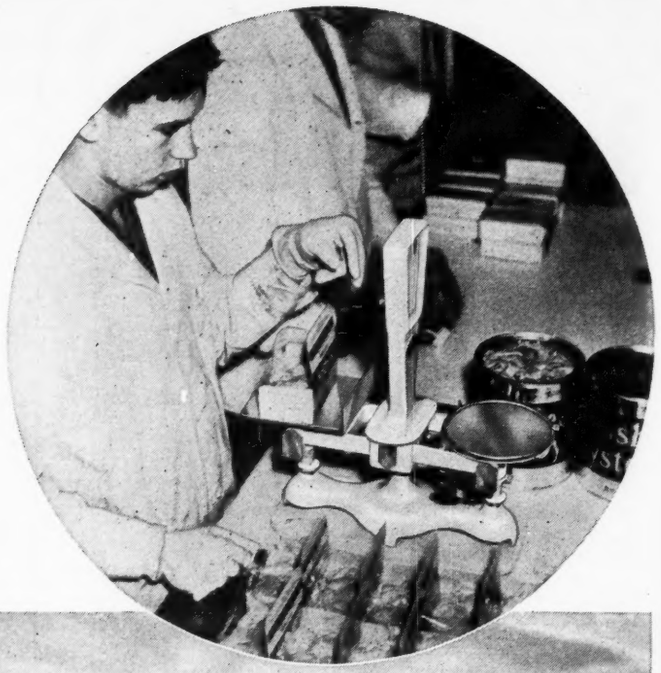
Our engineers have successfully helped many leading food plants to reduce expense with Economy Conveyors. They will gladly help you.

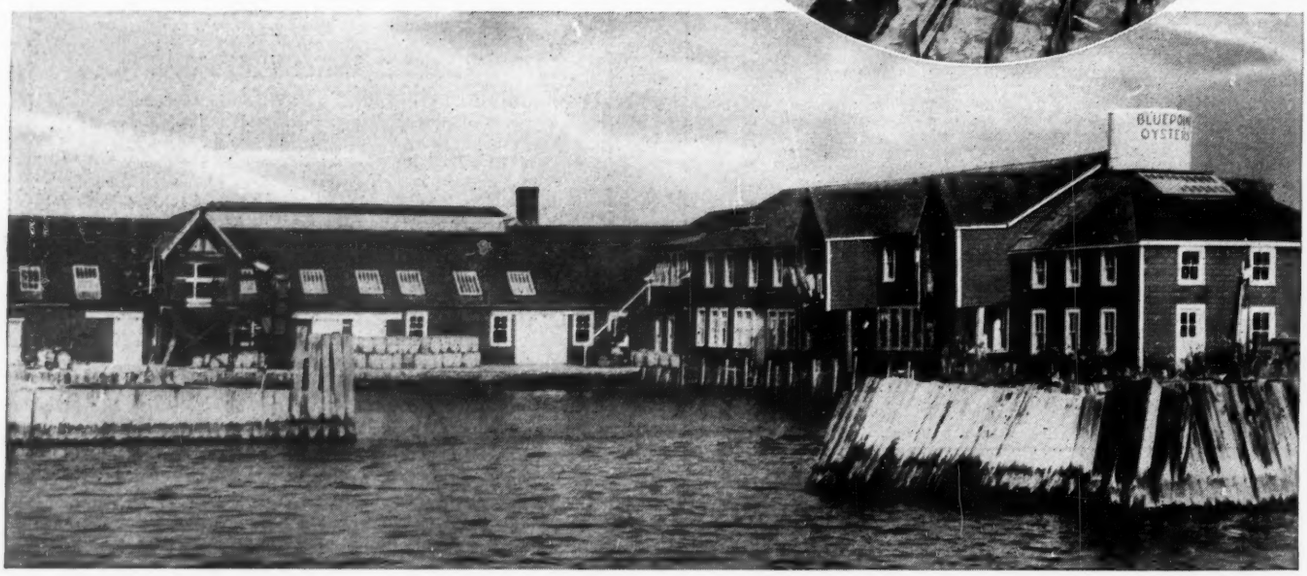
Write us today for descriptive literature. You will readily see how you can save space and cut costs. Ask for the suggestions of our engineers—you will find them versatile and helpful.

ECONOMY EQUIPMENT COMPANY, INC.
223 N. WOLCOTT AVE., CHICAGO
NEW YORK — LOS ANGELES

SCALES

That Keep Packages of Oysters Uniform





651-CA24.30

The Bluepoints Company's West Sayville plant at Long Island supplies packages of frozen oysters to the famous Birds Eye Frosted Foods System.

To maintain package uniformity and to protect the interests of both buyer and seller, each package is weighed on Fairbanks Precision Scales before the oysters are frozen.

Packaging oysters, weighing dough and bakery products, counting small parts, proportioning the aggregates of concrete, quantity controlling the ingredients of paint, weighing carloads of coal in motion, checking the accuracy of water meters, automatically checking and supplying printed records of incoming raw materials and outgoing finished products—these are only a *few* of the hundreds of diversified jobs that are accurately handled by Fairbanks Scales.

Whatever your weighing job—there is a Fairbanks Scale built for it. The organization that made Fairbanks the greatest name in weighing is at your call. Fairbanks, Morse & Co., Dept. 33, 600 South Michigan Avenue, Chicago, Illinois. Branches and service stations throughout the United States and Canada.

FAIRBANKS-MORSE

The Greatest Name in Weighing

FAIRBANKS SCALES

SCALES

IS YOUR PACKAGE WASTING YOUR MONEY?

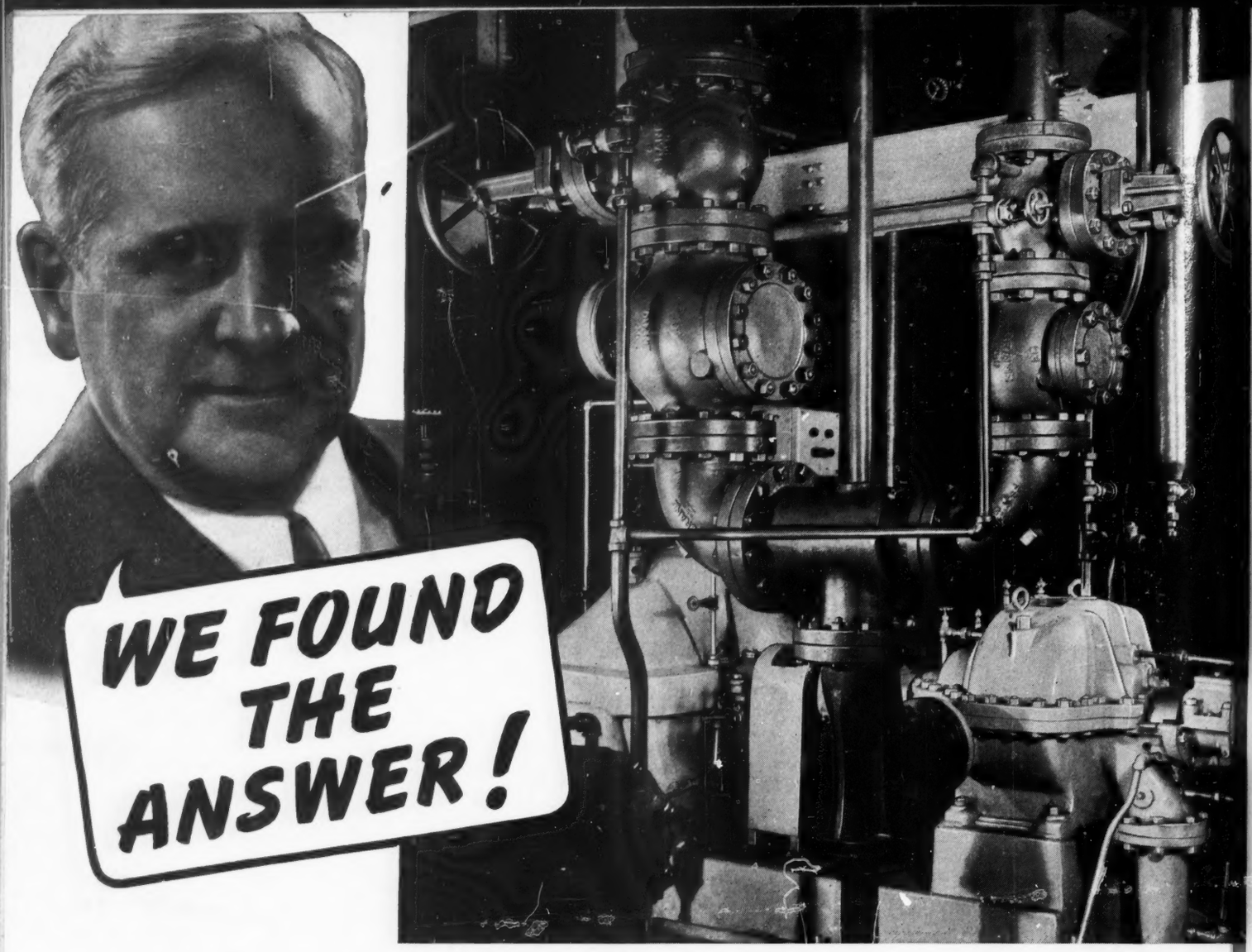
If your metal package is not as good as the product, then it is turning away sales. Heekin Lithographed Cans are selling merchandise from coast-to-coast. Heekin Colors are known for their true-tone reproduction — their lasting lustre — their natural beauty. Every manufacturer or potential customer . . . large or small . . . warrants our personal attention.

THE HEEKIN CAN CO.
Cincinnati, Ohio

HEEKIN CANS

Lithographed

WITH HARMONIZED COLORS



"PREVENTIVE MAINTENANCE keeps our piping costs down"

ACTUALLY, it's nothing new—many hundreds of plants are doing it every day. It's just a matter of using good foresight when you're buying valves and fittings.

Preventive Maintenance is simply this: It means fortifying your piping with extra resistance to the stress and strain of service conditions. There lies your greatest assurance of dependable flow control at minimum cost. And it means making sure that your piping equipment is right for the job to be done—right for the safety required.

Whether your plant is small or large—with Crane valves and fittings you can carry on a successful program of Preventive Maintenance. That's because in Crane-Quality you get the finest development of design and materials in flow-control equipment. And in the Crane line of over 38,000 items is exactly the one you need for efficient and economical piping in every application in your system.

Just as he has helped others, your Crane Representative will gladly work with you. Through him, Crane's vast experience in solving industry's piping problems is applied to your individual case. Back of him, at your service, are Crane's extensive resources of technical knowledge, Crane's elaborate research and plant facilities.

If you *now* have a piping problem that's giving you headaches, then get started *now* on a Preventive Maintenance program. You'll save many dollars—you'll have peace of mind. Call your Crane Representative today.

CRANE

CRANE CO., GENERAL OFFICES
836 S. MICHIGAN AVE., CHICAGO
VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS